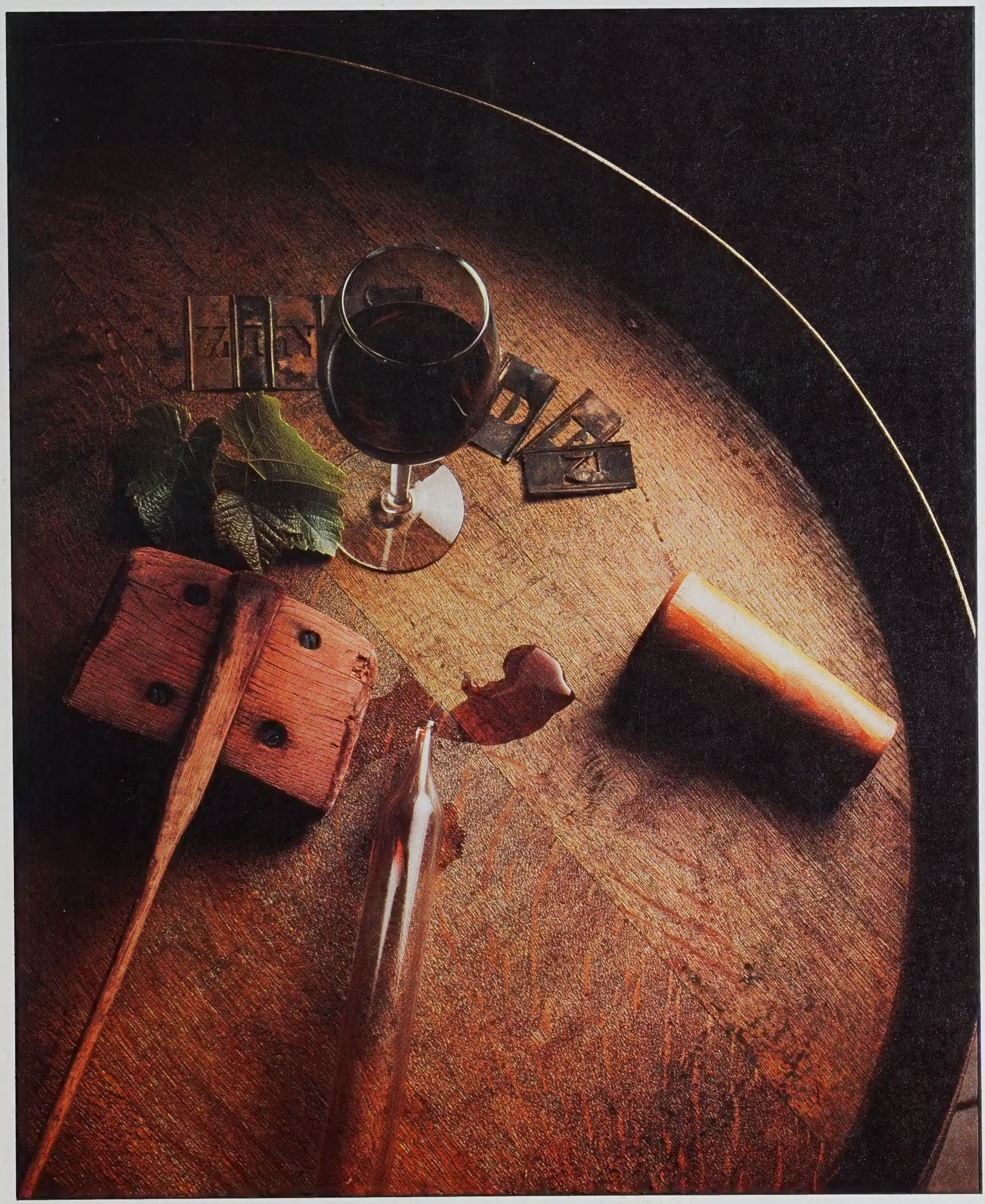
NOV/DEC 1984

The Grape-growing & Winemaking Review

$3.75

PRACTICAL WINERY



BULK RATE
U.S. POSTAGE
PAID
SAN RAFAEL, CA.
PERMIT NO. 303

When it's time to order your new wine press or other equipment, don't forget to ask the hard questions.

Such as:

Customizing available to your specific needs?

Engineering assistance, recommendations?

Installation supervision, responsibility?

Spare parts availability?

24-hour repair/consultation service?

Will the company still be in business in 3 years? 8 years?

When you buy winery equipment "off-the-shelf" or by model number, that usually means you're simply buying what's available. In reality, what you should be buying is what you *need* . . . equipment designed and sized to your specific requirements. And from folks who've been in business for half-a-century and understand your environment, your grapes, your problems . . . and who will respond when it's urgent.

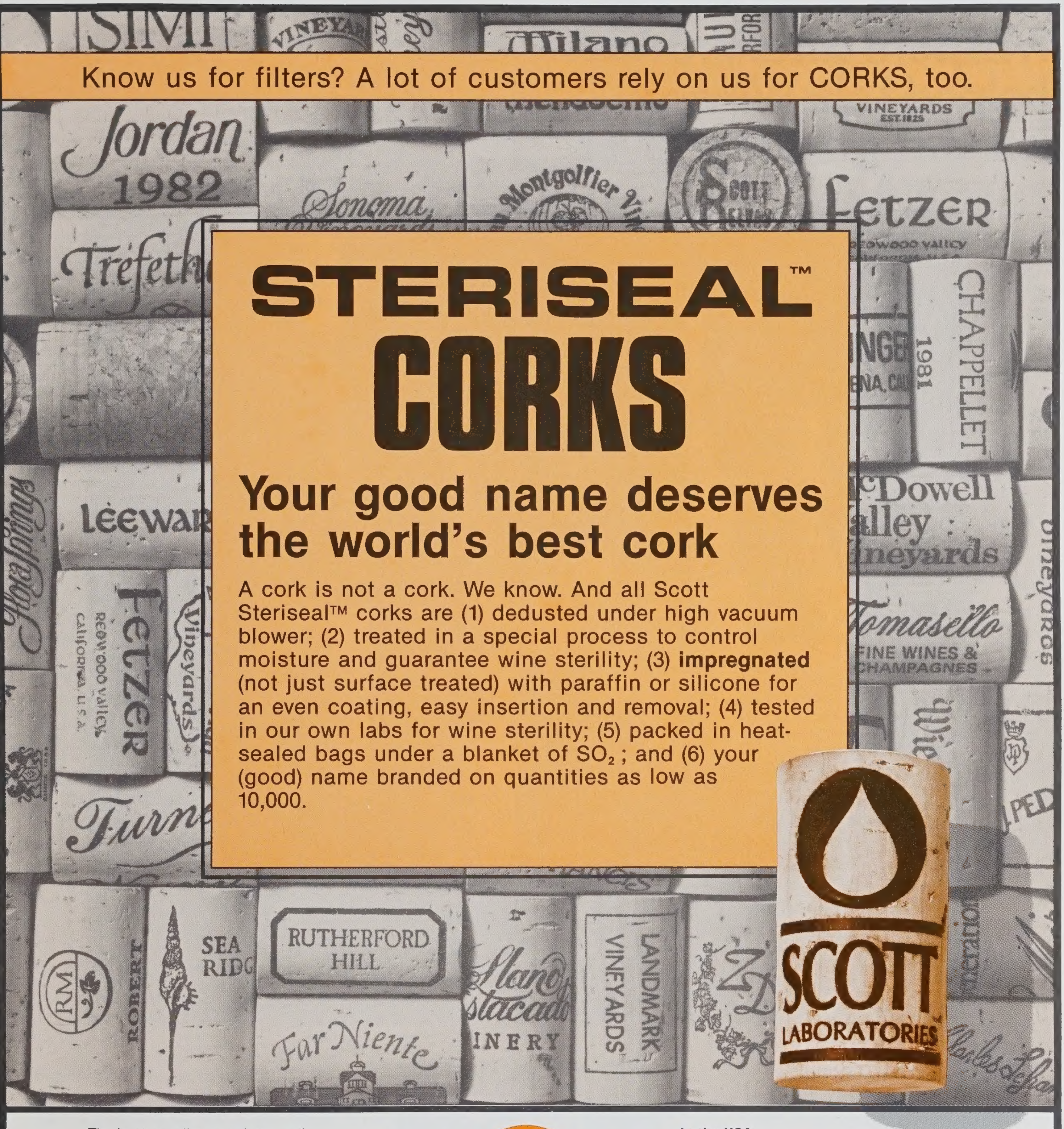
Doesn't sound like much? When the harvest is rolling, would you rather order an emergency part from Valley . . . or from Europe?

Last question: Why roll dice when you can be a winner without gambling? Write or call for our new bulletins on wine presses, crushers/stemmers, dejuicers, storage tanks or accessory equipment. AMETEK, Valley Foundry & Machine Works Div., 2510 S. East Ave., Fresno, CA 93706 (209) 233-6135.

VALLEY
FOUNDRY & MACHINE WORKS
A Division of AMETEK

MADE IN USA

Know us for filters? A lot of customers rely on us for CORKS, too.



STERISEAL™ CORKS

Your good name deserves the world's best cork

A cork is not a cork. We know. And all Scott Steriseal™ corks are (1) dedusted under high vacuum blower; (2) treated in a special process to control moisture and guarantee wine sterility; (3) **impregnated** (not just surface treated) with paraffin or silicone for an even coating, easy insertion and removal; (4) tested in our own labs for wine sterility; (5) packed in heat-sealed bags under a blanket of SO_2 ; and (6) your (good) name branded on quantities as low as 10,000.

The best supplies, services, and equipment — **SCOTT LABORATORIES.**

- Wine Making Supplies
- Filtering Materials
- Corks and Packaging Materials
- Laboratory Services
- Laboratory Supplies

MANZINI • MENESTRINA • K.E.W. • SCHENK • SABAT • VELO • R&D • UNI-PAK • AMERICAN FUJI • GUTH

SCOTT®

SCOTT
LABORATORIES

Serving Wine Since 1933

In the USA:

Scott Laboratories, Inc.
P. O. Box 9167, San Rafael, CA 94912
(415) 457-8460
Telex-171494 Scoti SRFL

In Canada:

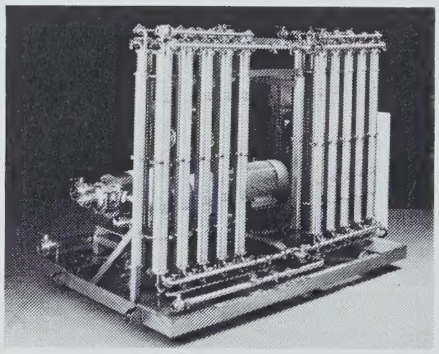
Scott Laboratories, Ltd.
950 Brock Road South
Pickering, Ontario, Canada LIW2A1
(416) 839-9463
Telex-06-981445 Scottlab PICK

Millipore ultrafiltration helped Lohr Winery harvest gold and silver.

"We invested in our Millipore Process UF System in 1982, and we couldn't be more pleased with the results.

"A non-vintage J. Lohr Cabernet Sauvignon, containing 40% ultrafiltered wine, won a gold medal in its class at Orange County and a silver medal at the American Wine Competition. And our 1982 Johannesberg Riesling won silver medals at the 1983 Orange County and Riverside Fairs."

—Barry Gnekow, Winemaker



In the typical Millipore ultrafiltration system pictured, oxidized and polymerized phenols, heat-unstable proteins, yeast and microorganisms can be removed in a single step. And ultrafiltration produces a 5% higher yield of high-quality product wine than with fining and traditional filtration techniques.

For more information on Millipore Process UF Systems, call our Technical Services Department toll-free at 800-225-1380 (in Massachusetts, dial 617-275-9200) or write Millipore Corporation, Bedford, MA 01730.

MILLIPORE

The Grape-growing & Winemaking Review

PRACTICAL WINERY

NOVEMBER/DECEMBER 1984 VOLUME V, NO. 4

FEATURES:

7 1985 Wine Industry Technical Seminar
19 BATF Wants Your Comments
21 Bottle Price Formula: Panacea or Anachronism *George Schofield*
24 Roguing Out Eutypa *Pat Summers*
27 Ultrafiltration
30 Acidity and pH Control *Leonard R. Mattick*
40 Sterile Filtration with Filter Sheets *H. Tesch*
46 Vines of Winery Lake *Don Blackburn*

DEPARTMENTS:

8 Wine Lawyer *R. Corbin Houchins*
11 In The Cellar *Jake Lorenzo*
12 Winery Water & Waste *David Storm*
14 Winery Finance *Richard C. Crichton*
51 PRACTICAL WINERY Library
52 Services For Grapegrowers and Winemakers
54 Index of Advertisers
54 Subscription Form
54 PRACTICAL WINERY Binder Order Form

Cover: Photograph by Kelly McManus, Santa Rosa, CA, is from the official poster of the Fourth Annual Sonoma County Wine Auction held August 25-26, 1984 at Souverain Cellars, Geyserville, CA. Poster design by Armstrong Associates, Santa Rosa, CA. Information on the 1985 Sonoma County Wine Auction is available from PO Box 434, Healdsburg, CA 95448

Editor and Publisher: Don Neel
Managing Editor: Anne Murphy
Writing Staff: Don Blackburn, Scott Clemens, Richard Crichton, Peter Gamble, Nancy Lynn Gray, Ray & Eleanor Heald, R. Corbin Houchins, Pat Howe, Denis Kelly, Jake Lorenzo, Michael Marcley, Diane Mayfield, Bruce Rector, George Schofield, Clark Smith, Rod Smith, David Storm, Pat Summers, Carole Taines, Lisa Van Der Water, Gerald Weisl, Bruce Zoecklein

Circulation Manager: Eileen Mulliner
Printing: Barlow Printing,Inc., Petaluma, CA

Offices: Advertising, Circulation, Editorial: 15 Grande Paseo, San Rafael, CA 94903 USA (415) 479-5819.
PRACTICAL WINERY (ISSN 0739-8077) is owned and published by D.F. Neel. Editorial/Business Office: 15 Grande Paseo, San Rafael, CA 94903 (415) 479-5819. Published bi-monthly at subscription rate of $24.00/year. Outside the United States, please add $8.00US sea mail; $20.00US, air mail. Application to Mail at Second-Class Postage Rates is Pending at San Rafael, CA. Postmaster: please send change of address to 15 Grande Paseo, San Rafael, CA 94903. Back issues: $5.00 prepaid. News media may use no more than 1/4 page of material per issue provided that *PRACTICAL WINERY* is credited.

> *"Food and wine are at once the most and least localized of the skills. Their development is due to commerce and to travel, and their continuity to stout regionalism; they take their character from the resources of the soil and climate at hand, yet may enrich it by an adaptation of some of the good things from outside."*
>
> *Sybille Bedford, writer*

Practical Winery Stories, 1984

FEATURE	ISSUE
Acidity and pH Control in NE United States *L. Mattick*	N/D
Applications of Pectinases	M/J
Ask Your Food	M/J
BATF Wants Your Comments	N/D
Bentonite *B. Zoecklein*	M/J
Bottle Price Formula	N/D
Burgundian Vinification of Chardonnay-I	M/J
Burgundian Vinification of Chardonnay-II	S/O
California's Fickle Grape Supply	J/F
California Inspection of Harvested Grapes	M/A
Clos du Bois Strategy & Development *F.Woods*	J/F
Computer Improves Use of Cooperage	J/F
Coping with Stuck Fermentations	J/F
Developing A Hillside Irrigation System *S.Soper*	M/A
Determining Grape Maturity	J/A
Domestic Wine Market Growth	M/A
Economics of Producing Chardonnay in the Vineyard	J/A
Economics of Producing Chardonnay in the Winery	S/O
Elimination of Fermentation Inhibitors	S/O
French Techniques of Cap Management	J/F
Future for Biotechnology in Vineyard & Cellar?	M/A
Growers and Wineries: Working Together *R.Phillips*	M/A
Grower's Perspective on Chardonnay *R.Wicker*	M/A
Howe to Buy Wine in a Restaurant	M/J
Howe to Score a Wine	J/F
Improving Accuracy of Crop Estimates	J/A
Individuality & Craftsmanship *B.Ramey*	J/F
Life Among the Malolactics *L.Van Der Water*	M/J
Malolactic Bacteria: Research & Applications	S/O
Maceration of Cabernet Sauvignon	M/A
Monitoring Sugar/Berry *Z.Long*	J/A
Must/Wine pH Quality *R.Beelman*	J/F
New Detection Method for Grape Defects	S/O
Pennsylvania Pragmatism: Naylor Wine Cellars	M/A
Predicting Vineyard Yield	S/O
Present Technology & Use of Malolactic Bacteria	M/J
Research Funds Essential	M/J
Riesling Varietal Analysis Elk Cove • Fenn Valley • Firestone • Glenora Gold Seal • Greenwood Ridge • Hillcrest • Hinzerling Jekel • Preston • Sakonnet • Smith-Madrone	M/J
Roguing out Eutpya	N/D
Selecting a Pump: Designs & Options *D.Power*	M/J
Seyval Varietal Analysis Boordy • Cedar Hill • Fenn Valley • Glenora Meredyth • Mt. Pleasant • Montbray • Naylor Nissley • Rolling Hills • St. Julian • Wickham	J/A
Shiraz/Syrah Varietal Analysis Bonny Doon • Estrella River • Hardy's • Knight McDowell Valley • Orlando • Joseph Phelps Qupe • Taltarni	S/O
Sources of Reinfection *F.Neradt*	J/F
Stand Up for Zinfandel *R.Kozlowski*	M/A
Sterile Filtration with Filter Sheets *H. Tesch*	N/D
Stratford Winery: The Right Moves	M/J
Sulphur Dioxide: Limits of Our Understanding	M/J
Tank Presses Replace Screw Presses at Inglenook	S/O
Time to Reconsider Wine Marketing *M.Cliff*	M/A
Ultrafiltration	N/D
Vinification of Zinfandel at Ridge	M/A
Whole Berry Fermentation - Winemaking Analysis Amity • Alexis Bailly • J. Lohr • Robert Pecota	J/F
Wine Ageing in the Bottle *J.Meyer*	M/A
Wine Auctions: A View From The Rostrum *P.Grubb*	S/O
Wine Inventory Quandry: Shortage or Surplus?	M/J
Winery Lake: Viticultural Perspective	N/D
Wineries & Money	J/F

DEPARTMENTS	ISSUE
In the Cellar *Jake Lorenzo*	
Grapes and the Pied Piper	J/F
Judging	M/A
Tradition	M/J
Splashes of Color	S/O
Ants, Fate and the Moon	N/D
Must to Market	
Marketing in a Controlled State	M/J
A Second Opinion in Pennsylvania	S/O
Trumpetvine Wines Sells Zinfandel	M/A
Quality Approach *Bruce Rector*	
Malolactic in Red Wines	J/F
SO_2	M/A
Flashlights	M/J
High pH	J/A
Racking and Lees Contact	S/O
Wine & Food	
Beaujolais Nouveau	J/F
Riesling Variations	M/J
Winery Finance *Richard C. Crichton*	
Winery Valuation	N/D
Wine Lawyer *R. Corbin Houchins*	
Distribution-Part III	J/F
Divorce and the Single Winery	M/A
Labels and the Business of Wine	M/J
Wine without a Winery	J/A
Pitfalls in Termination	S/O
Legal Developments Affecting Pricing	N/D
Winery Water & Waste *David Storm*	
Cutting Overhead Costs	S/O
Site Planning	N/D

Everyone with more than a cursory interest in grape-growing and winemaking should be reading PRACTICAL WINERY. 1984 back issues are available for $5.00 each, including postage. Please mail your request together with your payment. Subscribe now!

PRACTICAL WINERY • 15 Grande Paseo • San Rafael, CA 94903

Letters

Dear Editor:

As a non-technician who has just been introduced to your excellent publication, I would like to comment on your Jan./Feb.'84 and Sept./Oct.'84 issues from the Rhône Valley (France) point of view.

The 'Whole Berry Fermentation' story by Don Blackburn just may be the best I have read in English on the subject. He quite rightly distinguishes 'semi-carbonic maceration' from both CM (carbonic maceration) and its variant VB (vinification beaujolaise). Even more important is his accurate observation that 'true carbonic maceration is not as widely used as many people think.'

I can add from my own experience in the region that this observation holds very strongly for the southern Rhône, including Châteauneuf-du-Pape, where many wine writers would have you believe otherwise. Besides succumbing to the understandable tendency to reproduce inaccurate generalizations that once in print are hard to extirpate, these writers may have been misled by the local conduct of 'semi-maceration' in closed fermenters into thinking that 'true carbonic' is going on.

The view I hear in the Rhône Valley is this. Since CO_2, being heavier than air, rests in a layer over a properly cap-managed open fermenter, the chief difference between open and closed as far as 'semi-maceration' is concerned is not the trapping of CO_2 in the latter. Instead it is that in closed vats of the usual sort you have only remontage (pumping over) and not both remontage and pigeage (punching down) to manage the cap and to provoke the desired gradual crushing during the course of fermentation.

The preferred name in the Rhône Valley for 'semi-maceration' is *la méthode à l'ancienne* (old-fashioned method). My evidence from up and down eastern France strongly suggests that this method is the very 19th century 'long fermentation' whose disappearance in Burgundy is as much mourned by the writers as its reappearance in the Rhône is decried for being 'carbonic'.

The old-fashioned method is indeed widely used in the hot dry climate of the southern Rhône for the reasons noted by Blackburn, namely, 'to counteract the fermentation's tendency to overheat,' and earlier by Charles Sullivan, 'to avoid releasing the tannic and astringent quality of the grape too early' (*PRACTICAL WINERY*, Dec.'80/Jan.'81). These are great advantages for the conduct of fermentation with the high sugar levels and easily oxidizable tannin of southern Rhône Grenache.

Which brings me to your Syrah issue (Sept./Oct.'84). Two of the California winemakers whose explicit model for Syrah is the *northern* Rhône are quoted as having tried it with Grenache. One of them said, "Grenache is blended into Rhône wines." In fact, Grenache is no more blended into Côte-Rôtie or Hermitage (which is never) than Syrah is the dominant grape of the southern Rhône (which is almost never). But my point is not a purist one, nor do I mean to criticize these important experiments. Rather it is to propose that the *southern* Rhône may be the pertinent model for winemakers who are looking to use Syrah in a premium wine with other French mediterranean varieties.

For interested readers, the schema, as expressed by this amateur, would be something like this: The old-fashioned method would be definitely employed, the bunches having been brought in whole from the field in hand-carried lugs. Co-fermented (where epoch of ripeness permits) or blended would be Grenache (dominant), Syrah, Mourvèdre/Mataro, Cinsault/Black Malvoisie, and a few old-vine Carignane in a Côtes-du-Rhône style.

All of these varieties would be grown, un-irrigated (except during severe drought), in stony or rocky, well-drained, in-fertile soil on well-ventilated hillside or benchland sites. Yields would be $2\frac{1}{3}$ tons/acre (Châteauneuf style) to $3\frac{1}{3}$ - $3\frac{1}{2}$ tons/acre (Côtes-du-Rhône style). The Châteauneuf style would be aged in large, re-used oak *foudres* for anywhere between 6 and 36 months. The Côtes-du-Rhône style might not see any wood at all.

Châteauneuf-du-Papes of the sort described that are available in California include: Domaine du Vieux Telegraphe (Brunier); Domaine Font de Michelle (Gonnet); and Domaine du Haut des Terres Blanches (R. Diffonty).

I would be very appreciative of hearing from any of your readers who know of work going on at all along these lines.

Yours truly,

Robert W. Mayberry

1985 Wine Industry Technical Symposium

The eleventh Wine Industry Technical Symposium will be held Friday and Saturday, January 25-26, 1985 at the El Rancho Tropicana Convention Center in Santa Rosa, CA.

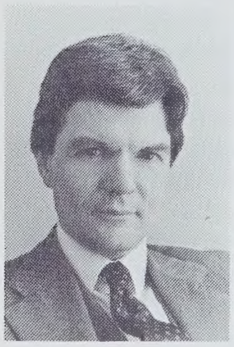
Friday's program includes a full-day marketing session coordinated by Ed Everett and a testimonial dinner at which Myron Nightingale, winemaster emeritus at Beringer Vineyards, St. Helena, CA, will be presented the Leon D. Adams award for contributions to the California wine industry.

Saturday's program includes: 'Status of Viticultural Research: Most Recent Advances', Professor Vincent Petrucci CSU Fresno; 'An Update on Wine Production in the Four Corners Region', Dr. Gordon Dutt, professor of Soils, Water & Engineering, University of Arizona; 'Impact & Implications of the New Marketing Order', Robert Hartzell, president, California Association of Wine Grape Growers; 'Balancing the Supply and Demand in Wine Grapes' (panel) George Vare, president, American Vineyard Foundation, moderator; 'Microbial Stability of Bottled Wines', Lisa van de Water, The Wine Lab; 'A Wine Photo Essay', Sandra Barrett, photographer; 'Recent Conclusions in Wine Oxidation', Professor Vernon Singleton, UC Davis; 'Tartrate Precipitation and Tartrate Stability', Professor Kenneth Fugelsang and Barry Gump,

to page 50

Friederich 12-Spout Rotary Filler - $2,950
Friederich Monoblock Filler/Corker - $10,500
Made in Switzerland, well proven quality and reliability.
In Stock For Immediate Shipment.
Favorable Financing Available.
ENOTECH CORPORATION 415/858-1090
P. O. Box 576, Palo Alto, CA 94302

USED BARRELS FOR SALE
60 gallon French Nevers Oak barrels . . . $40 each
50 gallon American Oak barrels . . . $30 each
For information call Joseph Phelps Vineyards
(707) 963-2745



The Wine Lawyer

R. Corbin Houchins

Legal Developments Affecting Pricing

In the first Wine Lawyer column, (PW July/August 1983) I reviewed some judicial challenges to laws which restrict the freedom of industry members to set and change the prices at which they sell their merchandise. In this column, we will update that review a bit and look at some broader implications.

The Modern Era

In a sense, the modern history of wine law begins with the 1980 *Midcal Aluminum* case, an antitrust decision which caused the entire California wine resale price maintenance scheme to tumble down overnight. Basically, the lesson of *Midcal* is that normal legal rules applicable to the rest of the business world apply in the liquor industry, except when what is being done is required by a state policy which is clearly announced by the legislature and actively supervised by a state agency. That exception is known as the 'state action exemption'.

Where Now?

Post-*Midcal* developments indicate both that the wine industry is headed toward the mainstream of packaged goods law and that the rate of change is very slow.

At one point, with the *Norman Williams* decision, the Supreme Court seemed to take a half-step backward in upholding a restriction on multi-state distribution that probably would not pass antitrust muster. Then, when that Court refused to disturb the California *Lewis-Westco* decision in the fall of 1983, it gave some comfort to those who would like to apply normal antitrust concepts to alcoholic beverage industry practices.

Nevertheless, considerable doubt remains regarding what a state law must say and what the state authorities must do in supervising it before a state action exemption will permit interference with free enterprise pricing of wine and distribution.

Battlefields

At this point, state price-posting schemes which require or permit suppliers to set the prices at which their customers may resell wine are essentially dead.

In July 1984, the state courts of New York threw out old State Liquor Authority Rule 16 and the underlying statute which required a minimum 12% resale markup over prices posted by wholesalers with no state supervision or review. Probably no state now has a law which provides the enunciation of policy and the state supervision in carrying it out which would be necessary to exempt a resale price maintenance scheme from antitrust challenge.

Presently, the legal battleground encompasses two main areas of practical significance to wineries: (1) 'Simple' price posting laws, which affect only the conduct of the winery or wholesaler that posts its prices, *e.g.*, by forbidding sales off published list and requiring a waiting period before changing list prices. (2) Price 'affirmation', which requires a winery or other supplier to warrant that a price charged to a buyer (typically a control state warehouse or a wholesaler in an affirmation state) is no higher than the lowest price charged to other buyers within some stated preceding period.

Remaining Price Posting Issues

In our industry uncertainty remains whether a non-exempt system which does not literally compel agreement on price will be permitted, even though it facilitates the kind of communication and aquiesence in stable pricing that would lead to antitrust liability in the normal business world.

The closest thing to a definitive answer is *Lewis-Westco*, which is, technically, the law only in part of California. That case can be read in more than one way, but at a minimum it teaches that a horizontal price-fixing conspiracy can be proven by showing a historical pattern of parallel pricing, with communication among the conspirators facilitated by a simple price-posting system.

Uncertainties about posting not withstanding, advice stated in the first column still appears valid: (1) Don't enter into an agreement with your distributor or a retailer or coerce him regarding the resale prices or markup of your product. (2) Don't discuss or even think of any kind of agreement or arrangement with your competitors affecting prices—not even a silent understanding to abide by price posting laws. (3) The safety of complying with price posting laws must be gauged on a state-by-state basis; after *Lewis-Westco*, perhaps it should be looked at market-by-market.

New Questions on Affirmation

At this writing, a hot topic in applying antitrust law to wine is the legality of the practice of requiring price warranties or 'affirmation'.

Two distinct kinds of affirmation exist. One is a state law restricting the right of a winery to ship a wine into the state by requiring that it affirm that the price charged the in-state buyer is no higher than the price at which the same item is being offered or sold to buyers elsewhere (with allowances for differences in state taxes and for transportation charges). The other, which need not appear in state law at all, is simply a customer's decision to refuse to do business with a winery without receiving such an affirmation.

Anomalies of Affirmation

The apparent intent of affirmation (which is sometimes called a 'Des Moines warranty', after the capital of a liquor monopoly state that promoted its use) is to cause the buyer to receive the supplier's best price. Its effect in practice is quite different, at least as to wineries which sell in more than one state.

When a winery sells to Customer A with a price warranty, it must take into account its prices to all other customers during the period used as the basis of the warranty. Warranties demanded by buyers differ as to the measurement period. Moreover, the period may not be clearly stated; at one time, Massachusetts had an affirmation law with the measurement period so inartfully described that its own liquor board could not say which past prices had to be compared to the warranted prices for the purpose of complying with the statute.

Commercial Law Questions

If a warranty does not state a measurement period, it is understood to apply to contemporaneous sales. How contemporaneous must they be? Is measurement retrospective, prospective or both?

Those are questions of commercial contract law, dependent upon such imprecise factors as the course of dealing between the merchants involved and industry custom. The same month or same 30-day bracket would seem to be the broadest likely interpretation. I would argue for the same day, or at most a period not to exceed 30 days and ending (in the case of prospective warranty) when some competitive challenge or other market event makes it reasonable to sell at a lower price elsewhere or beginning (in the case of retrospective warranty) just after such a sale.

Secondary Effects

By purchasing on affirmation—let's say for the sake of example, a retrospective warranty using the previous 60 days as the measurement period—customer A has essentially chilled the ability of the winery to respond to competitive challenges elsewhere or to open new markets.

If you have to plan for 60 days to sell everywhere else at or above the price you plan to charge A at the end of that period, and if your sales to A are important to you, you will refrain from lowering your prices. You will tend to forego entering new markets that require low prices to launch your brand, and you will be chary of meeting a competitor's promotional prices. Thus, like so many alcoholic beverage control laws, affirmation tends to stabilize pricing, to the detriment of competition and thus of consumers generally.

Legal Implications

Any practice that injures competition is suspect under the antitrust laws. As of press time, the Commonwealth of Pennsylvania, which is one of the nation's largest buyers of wine, had threatened suit to test the validity of affirmations required by other states that inhibited its ability to obtain price concessions.

My own guess is that, like simple price-posting laws, affirmation will stand or fall on the nature of the factual record put before the court. It will not be swept aside as invalid on its face, as were posting laws providing for resale price maintenance.

Meanwhile, what if one does make a sale that violates the affirmation clause in customer A's purchase order? Affirmations are contract terms and give rise to liability in case of breach like any other material promise, absent a description of a different remedy in the purchase order. Many affirmation clauses provide for rebate of the difference as the remedy; the price differential would also, in general, be the measure of contract damages in the absence of such a provision.

Withdrawal

A typical response to affirmation by a winery with multistate sales is not to offer customers who demand a price warranty the products that are essential to its marketing plans elsewhere.

Producers with the capacity to do so may offer a different wine or line of wines to those customers only, so as to eliminate ill-effects on pricing to other customers. Thus, consumers in the affirmation state may be unable to obtain the target product at all and may or may not be able to buy a near substitute at a higher price to compensate for special bottling and handling.

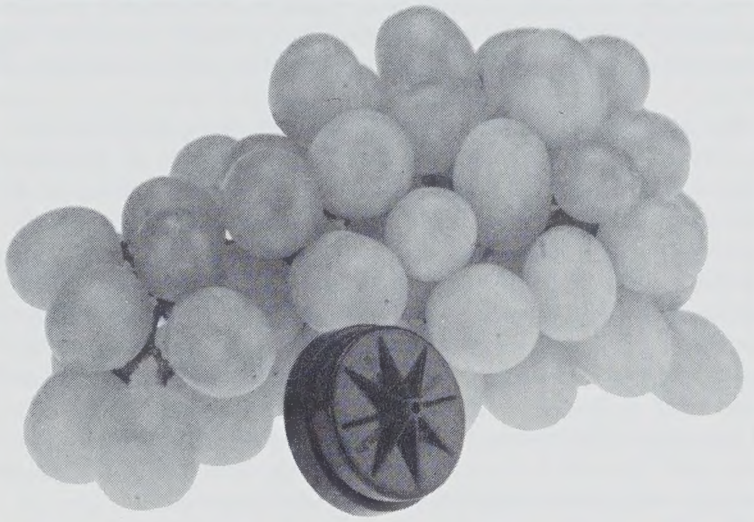
In the old days, one saw 'affirmation labels', differing in some detail from the main brand and applied to the product that was shipped to states requiring price warranties. The affirmation states have caught on to that and generally require warranties that are measured by prices of substantially similar

WINEMAKER/ENOLOGIST WANTED

First crush—1985 of 50,000 gallons vinifera
Experienced winemaker for Long Island, New York winery
70 miles from New York City
Enology degree from U.C. Davis or Fresno State required.

send resume to:
D.L. Mudd Consulting
County Road 48, Southold, NY 11971

no telephone calls, please



From the Pioneers of Dripigation™:

- ★ Complete Netafim drip irrigation systems that let you control growth, increase yields, conserve water, reduce labor costs.
- ★ Drippers, dripperlines, filtration systems, pressure regulators, fertilizer injectors, valves, fittings, pipe and tubing, accessories.
- ★ Irrigation system design and consultation.
- ★ Dedication to customer service. We can provide advice, counseling and follow-up service to assure you the best irrigation system for your needs and to help you get the most out of your fields.

NETAFIM™ IRRIGATION INC.
Pioneers of Dripigation™
Main Office: 104 S. Central Ave., • Valley Stream, NY 11580 • **(516) 561-6650**
Telex: 968842 NETAFIM VSTM. • Facsimile: (516) 825-4442
West Coast: 2577 S. Sarah Ave. • Fresno, CA 93706 • **(209) 485-9600**
Northern California: (707) 763-1117 *Dealer inquiries welcome*

products sold under any label. You cannot, therefore, solve the problem by bottling an insignificantly different blend with a special label—although I am prepared to argue that with wine it doesn't take much difference to be significant.

If you go the route of withdrawal plus a substitute product, at the very least use something your taste panel can pick out every time in a three-cornered test, and be aware that you may have an unhappy customer when your affirmation buyer learns of it. In most cases, the combination of separate bottlings and potential customer alienation make substitue products impractical for a small winery.

Other Responses to Affirmation

One alternative, which exhibits obvious shortcomings, is to run your business as if affirmation did not exist and rebate when you have to. Another, assuming affirmation is not required by statute, is to use your right under the Uniform Commercial Code (UCC) to accept an offer with alteration of terms.

The UCC route is not yet well charted. Essentially, it runs like this: Assume that Customer A sends you a purchase order containing an affirmation clause. It comes in three parts, two of which you are to sign and send back (possibly accompanying your invoice).

Before returning the signed copies, you stamp them with a rubber stamp which says, in effect, that the sales agreement contains only those terms that are set forth in the accompanying invoice. Your invoice has printed terms and conditions that cover— perhaps in identical wording and numbering—all the points mentioned in the purchase order *except* affirmation and include a provision that they may be accepted in writing or by receiving and paying for the goods.

The main uncharted part is whether deleting affirmation constitutes a material alteration of the agreement. Traditional warranties (such as fitness for consumption) are material, and the price itself is doubtless material, but the materiality of affirmation is an issue the courts have not yet decided.

If the affirmation clause is not material, then you have a sales agreement on the terms you and A agreed upon, with the terms on which you did not agree excluded. If affirmation is material, then you do not have an agreement unless A accepts your change. Formal acceptance is unlikely, given the nature of affirmation buyers, but A may accept the change by conduct—for example, by receiving and paying for the shipment, if that method of acceptance is reasonable under the circumstances.

The Future

Given its deleterious effects, one may hope that affirmation will fall into disuse, possibly with a little help from the courts. Affirmation is, however, only one possible target of challenges that could be made to anti-competitive practices in the wine industry. Numerous restrictions on distribution exist because of legislation, regulations or industry practice that grew up during the era when it was thought that the 21st Amendment shielded them from antitrust scrutiny.

It might be a good idea right now to think about the hazards and opportunities that the gradual deregulation of wine distribution could bring to your business.

R. Corbin Houchins is a partner in Duryea, Houchins, Murphy and Davenport, a business law firm, with offices in Seattle and Olympia, Washington and San Mateo, California. He has been associated with the alcoholic beverage industry since 1971.

A FULL LINE OF PVC
HEAT SHRINKABLE
CAPSULES

- Designed to your specific needs
- With perforations or tear strips
- Tamper proof
- Economical

Now manufactured in San Jose
Available from:

Exclusive West Coast Distributor for the finest quality equipment and supplies
MOFFETT COMPANY, INC.
6985 Via Del Oro, A-5, San Jose, CA 95119 □ Phone (408) 578-4910 □ Telex 357473
Our Eastern Rep.: Robert L. Stollenwerk Co., P.O. Box 282, Hamburg Ave., Egg Harbor City, NJ 08215. (609) 965-0074.
Our Northwest Rep: Cascade Chemical Commodities, Ltd., 252 S.E. Kent Ave., Vancouver, B.C., V5X (604) 324-9239.

In The Cellar

Jake Lorenzo

Editor's note: Jake sent me a copy of this letter instead of a column. I called him to explain I thought his last few columns were getting a bit esoteric. He said, "Hannah Arendt dug Martin Heidigger, but Marty liked red wine." After all this time, Jake remains inexplicable—or is it incoherent?

Dear John,

The moon is grinning tonight. A sly grin. The night is balmy. I'm working an interesting case. I have lots of time to think—to philosophize, if you will. Since you're the only person I know who claims to be a philosopher, I'm addressing these ruminations to you.

Jake Lorenzo philsophy comes directly from long hours spent observing ants. There are always ants. Ants have a long, noble history. Industrious little buggers. Working, hauling, always on the move.

Everyone has watched ants. We've seen the long trains of two-way traffic resembling cars on a freeway. We've all seen the intricate tunnels and pathways of an ant farm. We've all watched an ant struggle with a load much bigger and heavier than he was.

And each of us in a fit of anger, or depression, or plain meanness has stood with a hose blasting hundreds of ants to oblivion like so many Egyptian soldiers in the Red Sea.

So, John, I sit here, under a grinning moon thinking there are levels. Ants are one level. They live in a world, work hard, raise a family, but occasionally they are suddenly, horribly, tragically destroyed by floods, poisons or big feet.

Ants have a saying for these catastrophies. Ants say, "Fate does what it wants, ants have to keep on marching."

Here John, we have a philosophy to live by. After all, man is just another level. We live in a world, work hard, raise a family and occasionally are suddenly, horribly, tragically destroyed by floods, cancers, or car crashes.

Doesn't it make you think, John? Who's squirting the damn hose? Who is this Fate?

I can tell you, John, it makes me think. It surely does.

Speaking of getting hosed, let's look at this last harvest. What a year. CRUSH starts and never stops. Everything is ripe at once. Pickers can't keep up. Wineries are jammed. The world's supply of tartaric acid is at an all-time low. And the moon is grinning. Have I mentioned that, John?

I watched this harvest. I marvelled at the majestic, sweeping power of Mother Nature. I sat stunned by the avalanche of this harvest.

But I saw raw courage and bravery in the face of such carnage. I saw people without sleep, without rest, without strength, summon nerves to work more. Mother Nature can do what she wants, cellar rats have to keep on working.

In light of the unprecedented wierdness of this harvest, and in light of the tremendous burden it placed directly on the backs of cellar workers everywhere, I find it ludicrous when I hear the annual mouthings of a few who continue to claim, "It's the best year ever."

It was not the best year ever, but like every other year, it was different from all the others. In its own way 1984 will create its own unique wines, and they, like newborn children, will grow to have lives of their own.

And John, the moon is grinning. I think it knows something.

Love, Jake

Eleventh Wine Industry Technical Symposium – 1985
Marketing – January 25 ★ Grapegrowing and Winemaking – January 26
El Rancho Tropicana – Santa Rosa, CA

The Wine Industry Technical Symposium (WITS) is a practical, non-profit workshop for the dissemination of grape and wine industry information and experience—following the end of each vintage year.

WITS Board of Directors are from the American Society of Enologists, UC Davis, CSU Fresno and *Wines & Vines.* Proceeds after expenses go for research. Over $12,000 has been distributed to date.

Eligible to attend is anyone engaged in commercial winemaking and grapegrowing and related promotion, research or instruction; suppliers, members of the trade and consumers.

The **Wine Marketing Workshop** will be held Friday, all day, January 25, from 9:00 to 5:00 p.m., directed by Ed Everett, marketing specialist and wine trade newsletter editor. (fee $82.50).

Friday evening at 7:00 p.m. will be a reception and the Achievement Dinner. All workshop and conference attendees are invited (reception and dinner, $50).

The **Saturday,** January 26, **all day Grape and Wine Conference** is the long-standing WITS technical program, with registration starting at 8:15 a.m. and discussion at 9:00 a.m. ($82.50 fee includes lunch and wine hospitality).

MAIL TO:

J.L. JACOBS, Sec'y
46 – 7th Ave., San Francisco,
CA 94118 (415) 752-2160

or

DIANA LYSTER, Asst. Sec'y
6 Fair Drive, San Rafael,
CA 94901 (415) 457-3007

Here is my check for WITS January 25-26,1984

_$82.50 Saturday, Conference, lunch, membership Jan. 26
_$82.50 Wine Marketing panels, lunch Jan. 25
_$50.00 Achievement Dinner, 7 p.m., Jan. 25
_$10.00 Transcript – Saturday's proceedings plus postage

Name(s) ____________________
(type or print)

Street Address ____________________
City ____________________ State ________
Phone ____________________ Zip ________

Registration both days at 8:15 a.m. Sessions begin at 9 a.m. with morning and afternoon coffee breaks. Table Top Exhibits also will be featured.

Winery Water & Waste

D.R. Storm, Ph.D., P.E.

Site Planning for Wineries: A Sanitary Engineer's View (A Site for Sore Eyes)

At the risk of incurring the wrath of the rather select group of winery architects, I will embark on what is dangerous ground for the common garden variety of sanitary engineer—winery site planning. It is strictly the province of the winery architect /planner, and should remain so. I hope to give operating wineries a framework in which to test the original site-planning as it relates to waste handling. For the wild and wonderful entrepreneurs who are about to undertake the planning or expansion of a winery, I offer some thought-stimulating questions with which you can dazzle your design team. (I should have prefaced this column by outlining for winemakers and operating principals who have not been through a design-construct project, what to expect and also what you should expect of your design professionals. We all know what to expect generally from our dentist, doctor and attorneys—but engineers, architects and planners? Not likely.)

The following is not intended to be a substitute for the advice and counsel of competent design professionals. Guidelines and planning suggestions are offered to help those who are about to embark on planning a new winery complex, to sort out their thinking for the planning element that often gets too little attention in the early planning stages: winery wastewater and wastewater solids handling, storage, disposal.

Odors

The winery location on a site is often fixed by winery principals long before a design professional is retained. A simple analogy can be made for most residential construction situations—buy the parcel of land, then find the architect to fit a structure to the site.

Realistically, fundamental decisions regarding ingress and egress for grapes, out-shipment of finished wine, and visitor access and parking must be given high priority early-on in the master plan of a winery. Options for uncongested traffic movement on a given site are sometimes limited. Routing of visitor traffic for avoidance of nuisance odors from wastewater ponds, pump station wet-wells and pomace storage zones is, in my view, of special importance. Setting the mood and feeling for the highest quality tasting and touring experience should be near the top of the priority list in master planning functions.

To woo contemporary wine consumers not only takes a good wine, but a tasteful winery environment. Any marketing expert will confirm my belief that the visitors/tasters take away with them not only the memory of an enjoyable experience, but an image that may influence future wine purchases.

Winery principals and the winemaker do not have to be planning professionals to take positive measures to avoid odor assaults on visitors or downwind neighbors. As the winery architect proceeds with the conventional site-constraint analysis (solar orientation, viewshed analysis, soils, drainage, etc.), the issue of air movement both daily and seasonally should be carefully scrutinized. Wind data are unfortunately not one of the parameters measured routinely at the weather station network throughout the U.S.

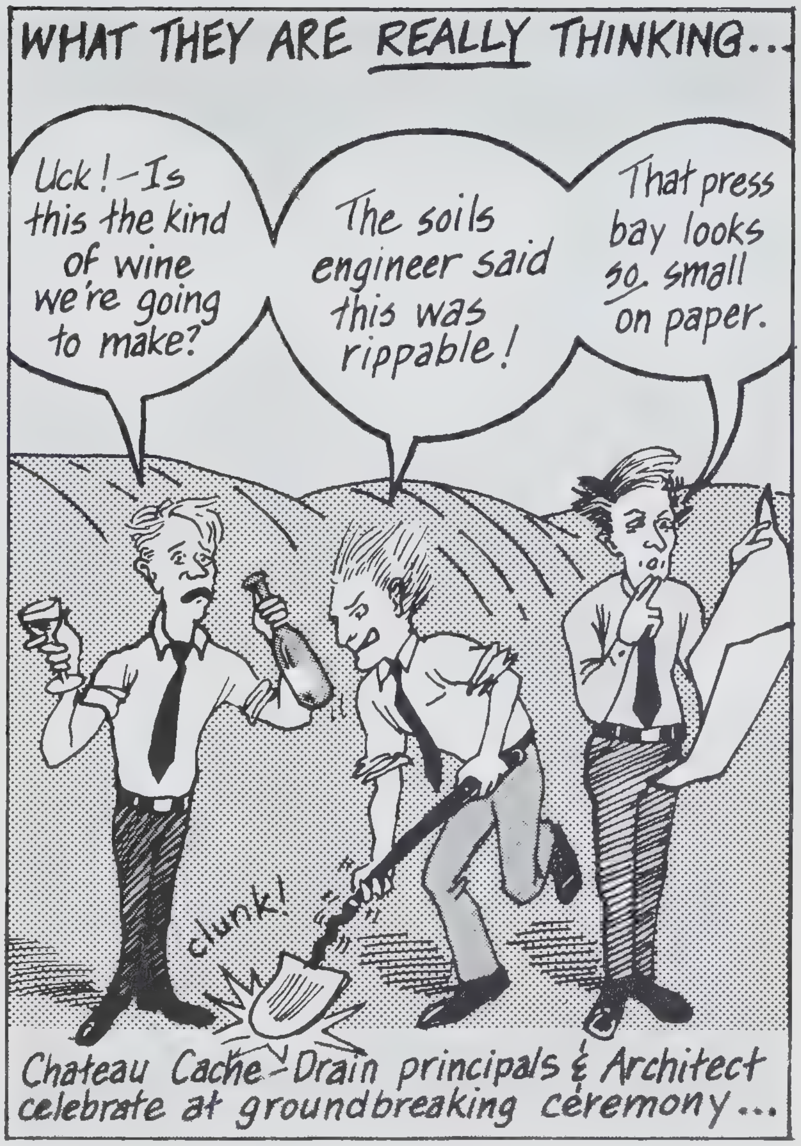
For example, *Climatological Data* (California) is published monthly by the National Climatic Center, Environmental Data Service, a National Oceanic and Atmospheric Administration Agency. Unfortunately, however, only those index stations which measure evaporation (pan evaporation) measure wind velocity, and it is only reported as wind movement in miles per day (dividing this cumulative total by 24 gives an average wind velocity in miles per hour, but no wind direction.)

VINQUIRY

To help develop, monitor and control your wines' special characteristics and production economics, we offer:

- **Laboratory and Field Analysis**
- **Consultation Programs**
- **Laboratory Supplies**
- **Certified B.A.T.F. Laboratory: Export (V.I.1)**
- **State Regulatory Analysis**

VINQUIRY: Winemakers Service and Research Laboratory
301-D East Street Healdsburg, CA 95448 (707) 433-8869


WHAT THEY ARE REALLY THINKING...
Uck!-Is this the kind of wine we're going to make?
The soils engineer said this was rippable!
That press bay looks so small on paper.
clunk!
Chateau Cache-Drain principals & Architect celebrate at groundbreaking ceremony...

Kris Strawser

Air Pollution Control agencies are often the source of excellent data on the seasonal movement of air at ground level and at several altitude increments. Airports often have recording anemometers, and for those with major air traffic, a 'wind rose' is sometimes prepared by the F.A.A. for use by pilots in seasonally predicting wind direction and velocity.

Other air movement data of importance (or non-air movement) are the periods of dead air, when winery generated odors are not dispersed and diluted by mass air turbulence. Obviously the most efficient odor suppression solution would be *not* to have the winery produce an off-nose emission.

Even the best designed, managed and operated wastewater systems become upset occasionally, and unless operators have devised a contingency plan, neighbors and travellers of adjacent roadways become acutely aware of the winery's presence. The site-planning lesson illustrated here is that the location of the waste treatment plant should be tested against the seasonal wind and dead-air data to identify those odor targets most likely to voice a complaint.

The treatment plant facility is the potential primary odor producer, but the strategic location of manholes and wastewater pump stations should also be carefully selected to avoid future unwanted fragrances. In dead-air conditions, upgrade (higher elevation) locations may receive odors as lighter warm air is heated during the day. Downgrade zones (lower elevations) may receive odors at night in a dead-air scenario, as the cooler, heavier air may tend to flow downward replacing lighter, warmer air which continues to receive radiant energy from such sources as streets, structures, etc. (In a subsequent column, *Monitoring Waste Treatment System Performance*, I will suggest some techniques by which periodic nuisance odors can be reduced, and in some cases, eliminated.)

Another important thing to remember is that nuisance insects, some of which occur seasonally with the crush, are transported by mass air movement. Any hungry mosquitos bred in your wastewater ponds can just as surely find your neighbors as easily as the unpleasant odors move to-and-fro (only they have wings!).

The friendly fruit-fly and unfriendly yellow-jacket are more likely to stay in and around the winery where the promise of new fruit, pomace, and other entomological gourmet items form the major attraction for those insects.

Solid Handling

Sound winery planning must also include serious thinking by the winemaker and the architect on the disposition of solids, provided at crush and to a lesser extent during other winemaking process steps. From a waste treatment standpoint, it is very desirable to minimize discharge of solids in the waste stream from the winery. The obvious benefit is a reduction in organic loading on a waste treatment facility and a potential reduced cost in terms of energy and treatment plant upkeep.

For example, the recent widespread use of lees filters not only permits the salvage of wine, but the solids residue can be recycled into the vineyard; or if imaginative livestock operations are nearby, the filter cake may be used as cattle or swine feed supplements. Bentonite lees are also a solids component that should be dealt with in-winery, if possible. For small wineries with septic tank and leachfield systems, (as with the section following on 'Case Studies') the elimination of bentonite lees discharge to the sewerage system is imperative. The colloidal particles are difficult to settle-out in waste treatment plants and the fine clay particles can shorten, if not end the useful life of a leachfield system.

One further comment regarding the planning for solids is worthy of mentioning, and that concerns an almost philosophical point-of-view by the winemaker regarding solids handling. Whether basket strainers in crush pad, press bay and tank room floor drains are superior (less of a maintenance headache), than providing a single gravity screen or rotary drum screen at the waste treatment plant end of the raw process-water sewer, should be discussed with the winery architect.

Winemakers who have lived with basket strainer systems, are generally in agreement that the attention that the strainers receive for servicing, is inversely proportional to the activity in the winery. (Which means that during crush no one has the motivation to empty basket screens.)

Finally, pomace is the largest single solids component produced by the winemaking process. Materials handling aspects for modern continuous-flow presses have been marvelously simplified. For smaller batch presses the mechanics of removing solids and transfer to truck or bin is somewhat more troublesome (pomace pumps, continuous screw augers, etc.). Pomace disposal is often a simple incorporation of the material into vineyard soils. Dumping in local or regional sanitary fills is also practiced by many large wineries. The bottom-line on a benefit-cost analysis for the recycling of megatons of grape pomace is apparently not favorable.

(Our winery has developed a happy marriage between the seasonal pomace supply and a nearby swine operation. Once the pigs learned what a delightful meal we were bringing to their pen, they would stand on their hind legs at the fence and grunt with anticipation. The hog farmer dries a portion of the white grape pomace, which is higher in sugar content, to use as an additive to the normal diet later in the year. Red grape pomace is used for feed—almost as produced. The operator further claims that the hogs are happier (hic!) and that upon slaughter yield pork of outstanding quality.)

to page 55

Winery Finance

Richard Crichton

With this issue PRACTICAL WINERY begins a regular feature on winery finance. Future columns will include tax planning and strategic planning.

Winery Valuation

Why is understanding the worth of your business a useful management tool? Clearly, if one considers selling a winery a realistic assessment of the value is essential. Being able to project the winery's future value is important in structuring buy/sell agreements. If buy-outs are based on loosely defined 'market value', an owner/manager may find that the buy-out of a partner will force the sale of the entire business. Estimating the future value is also useful in estate planning for family-owned wineries where the ownership between family members can be structured to minimize estate taxes.

In planning for future capital requirements, knowing the business' value will assist in deciding whether to raise additional equity or rely solely on borrowed funds. Wineries run into financial difficulties more often because they are under capitalized than because the operation is inherently unprofitable. In a capital intensive industry equity may be a cheaper form of financing in the long run than overly leveraging the business with debt.

A particular problem with valuing a business like a winery, compared to, say, a vineyard, is that there are very few comparable transactions upon which to establish a market price. Often owners who are potential sellers place unrealistic values on their wineries with the result that the business is on the market for a long time—causing problems with customers, distributors and employees and creating a 'shop soiled' image. The eventual sales price may well be lower than what could have been attained had it been realistically valued at the outset. (If you are considering selling your winery business, first get an independent appraisal—it may change your mind.)

Given that it is useful to know the value of your winery, the difficult part is how to determine that value. The methods vary widely and different ones are applicable in different situations. Some of the commonly used techniques are outlined below and then subsequently applied to a model small winery.

Book Value

This is the value at which assets, liabilities and shareholders' equity are recorded on the books of a company. The value is based on historical cost less depreciation, and will not reflect any appreciation in fixed assets, increase in the market value of inventory or goodwill. The appraised value of a business is often expressed as a premium, or discount, to book value. The book value of the equity is defined as assets less liabilities.

Asset Value

Asset value represents the appraised value of assets and includes appreciation in fixed assets plus the net realizable value of the inventory as a going concern. While banks tend to ignore this value for lending purposes, it is a prime method of determining value with respect to investors.

Break-Up Value

This assumes the business is dissolved and the individual assets auctioned off. It will normally result in a lower value than if the business is sold as a going concern, but may be relevant as the ultimate collateral value against which banks will lend.

Price/Earnings Multiple

The P/E is the ratio of price to annual net income after tax and is a principal yardstick for valuing the stock of publicly quoted companies. It *does* presume that the business is generating a profit.

Earnings Yield

This is the inverse of the P/E, i.e., net income divided by the price, and represents the percentage after tax earnings yield on the investment.

Capitalization Rate

The so-called 'cap rate' is a method frequently applied to commercial real estate transactions. To determine the value of a property, the net income from operations before interest and tax is divided by the cap rate; for example, using a cap rate of 8% the property would be worth 12½ times annual income. Unlike the P/E and earnings yield, this method values the assets and not equity, and after calculating the property value any debt on the balance sheet must be deducted to arrive at a value for the equity.

Comparison with other Transactions

The small number of transactions and the limited information available concerning them—coupled with the uniqueness of each winery—make direct comparisons difficult. Nevertheless, they provide important indications of both the level of investor interest in the industry and broad parameters of market value.

Value of Intangibles

Principle intangible assets of a winery are its name, label, reputation, distribution system and customer list. By definition these are very difficult to assess individually, but for an established winery their value will generally be reflected in the level of sales and price of the wine which can be analyzed (as we shall see below). There may be an added premium to a buyer if the winery has some special feature, such as a unique building or reputation, that a new owner can exploit to generate additional sales. Conversely, negative features such as a poor reputation or bad location may justify a discount.

Premium for Control

As has been very evident from the recent spate of well-publicized corporate takeovers, if it costs $50 per share to buy one share in a company, it will probably cost at least $75 per share, or 50% more, to buy the entire business. This concept of a control premium is universal.

If an individual, or corporation, wants to make a substantial investment in the wine industry it will—in the majority of cases—be because they believe they can bring some added value to the business, such as marketing expertise. To implement these ideas will invariably require control of the business, not a passive investment, and the investor should be prepared to pay more for this privilege.

The owner in turn will require a greater inducement to relinquish control than he would to give up a minority interest

Table I

Income Statement
($000)

		$	% Revenues
a)	Revenues:		
	California	434	41.8 %
	Out-of-state	442	42.5 %
	Retail & Mailing List	163	15.7 %
	Total	1,039	100.0 %
	Cost of Goods Sold:		
b)	Grape Cost	250	24.1 %
c)	Packaging	112	10.8 %
d)	Winemaking	19	1.8 %
e)	Capitalized Overhead	40	3.8 %
	Total Cost of Goods Sold	421	40.5 %
	GROSS PROFIT	618	59.5 %
	Operating Expenses:		
f)	Commissions	43	4.1 %
g)	Selling, Freight & Storage	125	12.0 %
	Salaries & Benefits	150	14.4 %
h)	Administration	42	4.0 %
i)	Other Expenses	31	3.0 %
e)	Less Expenses Capitalized	(30)	(2.9) %
	Total Operating Expenses	361	34.7 %
	OPERATING PROFIT	257	24.7 %
e)	Depreciation Expensed	40	3.8 %
	PROFIT BEFORE INTEREST AND TAX	217	20.9 %
j)	Interest Expense	75	7.2 %
	PROFIT BEFORE TAX	142	13.7 %
k)	Provision For Tax	51	4.9 %
	NET INCOME	91	8.8 %

Notes to Table I

a) Retail prices per bottle: Chardonnay $11, Cabernet $11, Sauvignon Blanc $7.50. Case sales: 40% in California @ two-thirds of retail less average 8% discount; 10% retail and mailing list @ retail less average 8% discount; 50% out-of-state @ 50% of retail.

b) Yield of 60 cases per ton and grape cost per ton of Chardonnay $1,300; Cabernet $900; Sauvignon Blanc $800.

c) Packaging @ $7.50 per case.

d) Direct winemaking costs @ $1.25 per case.

e) Operating costs of $30,000 and depreciation of $10,000 allocated to inventory.

f) Average 10% commission on California sales.

g) Selling, freight and storage @ 12% of revenues.

h) Administration @ 4% of revenues.

i) Other expenses @ 3% of revenuses.

j) Assumes debt of $500,000 and interest at 15% per annum.

k) Approximate State and Federal income tax assuming winery is incorporated.

in the profits. Even if the investor seeks only romance, there is a lot more romance per share being the owner with your name on the bottle than there is being one of a dozen minority shareholders. This is not to say that one should shun the passive investor; on the contrary, for each person seeking to own a winery there may be a hundred willing to make a small investment. However, the value placed on the winery in the two cases will be materially different.

These valuation techniques will now be applied to a model small winery. The winery is assumed to have been established for five years and is now producing and selling 15,000 cases of premium varietal wines (5,000 cases each of Cabernet and Chardonnay with a retail bottle price of $11 and 5,000 cases of Sauvignon Blanc at $7.50). Sales are 40% California wholesale, 50% out-of-state and 10% retail at the winery, plus mailing list customers.

Tables I and II show a typical income statement and balance sheet. Since the accounts of private companies are generally structured to minimize tax rather than maximize profits, adjustments may need to be made to the reported results to show the true profitability. For simplicity, profit before tax is assumed to equal cash flow with capital expenditure equal to depreciation.

First let's look at some operating ratios. Profit before interest and tax appears fairly healthy at 20.9% of revenues and net income is 8.8%. However, the capital intensive nature of the business is exemplified by the relatively low return on assets employed at 14.4% (profit before interest and tax of $217,000

Table II

Simplified Balance Sheet
($000)

ASSETS	
Current Assets	
Cash in Bank	$ 40
Accounts Receivable	128
Inventory	850
Total Current Assets	1,018
Fixed Assets	
Land	150
Building	240
Equipment	350
	740
Less Accumulated Depreciation	250
Net Fixed Assets	490
Total Assets	**$1,508**
LIABILITIES	
Current Liabilities	
Accounts Payable	$ 33
Short Term Debt	300
Total Current Liabilities	333
Long Term Debt	200
Stockholders' Equity	
Paid In Capital	800
Retained Earnings	175
Total Stockholders' Equity	975
Total Liabilities	**$1,508**

Table III

Appraised Value of Assets at June 30, 1984
($000)

Inventory	
* Case Goods:	
5,000 cases of '82 Chardonnay @ $77.50 x .75 x .90 =	$ 262
5,000 cases of '83 Chardonnay @ $77.50 x .75 x .74 =	215
5,000 cases of '81 Cabernet @ $77.50 x .75 x .90 =	262
5,000 cases of '82 Cabernet @ $77.50 x .75 x .74 =	215
1,250 cases of '82 Sauvignon Blanc @ $52.50 x .75 x .97 =	48
5,000 cases of '83 Sauvignon Blanc @ $52.50 x .75 x .86 =	170
26,250 total cases	1,172
Bulk Wine:	
12,000 gallons of '83 Cabernet @ cost	95
Total Value of Inventory	1,267
Fixed Assets	
Land (market value)	250
Building & Equipment (appraised value)	670
Total Fixed Assets	920
Net Liquid Assets	
Cash In Bank	40
Accounts Receivable	128
Less Accounts Payable	(33)
Net Liquid Assets	135
Total Value of Assets	**$2,322**

** Weighted average case price less 25% for cost of selling multiplied by a discount factor using a rate of 20% per annum.*

divided by total assets of $1,508,000). This is slightly less than the current borrowing cost of 15%. Return on equity is 9.3% after tax (net income of $91,000 divided by stockholders' equity of $975,000).

To illustrate the sensitivity of profits to the bottle price, a 50¢ increase in the average retail price would increase profits before tax by $51,000, or 36%, and the return on assets would rise to 17.8%. What does this clearly tell us? Right, invest in marketing—or better still: Why don't we require the Russians to buy one case of wine with every ton of wheat they purchase?

Turning to the valuation, we can see that the book value of the assets is $1,508,000 less liabilities of $533,000 for a net book value of $975,000 (stockholders' equity in Table II). In determining the asset value, case goods inventory has been valued at wholesale less marketing costs of 25% comprising commissions, selling expense plus 50% of other operating costs, then discounted at a risk adjusted rate of 20% per annum. This assumes that the winery's existing distribution system can sell all the wine in the year of release. If this is not a reasonable assumption, the unsaleable portion should be further discounted.

Again, for simplicity the inventory has been valued on June 30, 1984, the assumed release date for the Cabernet and Chardonnay, with all wine bottled except the '83 Cabernet. The release date for the Sauvignon Blanc is taken to be October. The resulting appraised value of the assets is $2,322,000 from which should be deducted debt of $500,000, for a net asset value of $1,822,000 (Table III).

One method of valuing additional goodwill is to estimate the volume of wine that could be sold to existing customers in subsequent years with the current level of sales support, then computing the present value of the profit margin on these sales. An analysis of your winery's past sales experience should provide a rough approximation of the attrition rate, which may be an informative exercise in itself.

In Table IV it has been assumed that retail accounts will be lost in increments of 25% per year after the current inventory is sold, restaurant accounts 17% per year, and retail sales and mailing list 10% per year. These are simplistic assumptions to illustrate the methodology and a more thorough analysis should be undertaken.

The profit margin is 34%, comprising gross profit of 59% less marketing cost of 25%. The resulting profit is discounted at the rate of 20% per annum to give a net present value of $367,000. Adding this figure to the asset value results in a total value of $2,689,000 or $2,189,000 net of debt. The premium over cost included in the inventory value could also be regarded as a form of goodwill, so one could view the latter valuation as representing total goodwill of $784,000.

It should be noted that from a buyer's standpoint value assigned to customer lists can be written off for tax purposes over the life of the accounts (whereas pure goodwill may not be deducted), if one can demonstrate this value and that the accounts have limited life.

Price/earnings multiples have two major drawbacks with respect to small businesses. First, because they are traditionally applied to after tax profits, a change in the effective tax rate may have a substantial impact. Second, the value will be affected by the level of debt and prevailing interest rates since the earnings are after interest deductions. P/E ratios are perhaps most relevant in this instance because outside investors will apply them whether we like it or not.

In Table V the P/E has been calculated using both the actual net income of $91,000 and pro forma earnings of $110,000. The latter assumes a buyer of the entire business could reduce tax payable by at least $19,000 through a step up in the depreciable basis of the assets. Good quality consumer product companies are typically acquired for P/E's of between 15 and 20; when applied to pro forma earnings this gives a range of value for the equity of $1,650,000 to $2,200,000.

The capitalization rate method avoids both of the above problems and is a more useful tool. Cap rates for commercial real estate are typically in the range of 8-10%. This relatively low return on investment is justified by the presumption that the value of the property will at least keep pace with inflation. One would usually expect real estate, that is land and buildings, to comprise less than half of the value of an operating winery with the balance subject to normal business risk. While this should imply a high cap rate and hence lower value, it may be offset by the panache of the industry and the potential of higher profitability in the future.

In the example one would calculate the cap rate value by dividing the profit before interest and tax from Table I of $217,000 by the cap rate. At a 10% cap rate the gross value is $2,170,000 or $1,670,000 equity value.

When calculating a value based on earnings as opposed to assets, one should not properly add on net liquid assets (shown in Table III) except to the extent there is surplus cash in the company. Accounts receivable, net of accounts payable, plus sufficient cash to operate the business constitute permanent working capital that will never be realized by a going concern.

A range of values using the different methods is set out in Table V. If one wished to raise new equity through the sale of minority shareholdings, an equity value of around $1,400,000 might be appropriate. This represents book value plus the $430,000 appreciation in fixed assets, but no goodwill per se. The P/E is 15 times actual earnings, the current earnings yield is 6.5%, and the cap rate 11.4%.

In structuring a minority shareholder buy-out agreement, a formula related to both the value of the assets and profitability would provide the investor with some protection if the business is not currently profitable, while enabling him to participate in the added value if the winery is successful. The agreement might specify a price equal to the greater of book value plus appreciation in fixed assets or the value based on a cap rate of 10%.

In the example, a founding shareholder who had invested $40,000 for a 5% interest (5% of the $800,000 of paid in capital in Table II) would receive $83,500 under the buy-out formula (5% of the 10% cap rate value of $1,670,000).

When assessing value in the case of a sale of the entire business many more factors will come into play and the range of possible values will be very wide. The number of successful, profitable wineries that are for sale at any one time is very limited so such an operation may be able to command a substantial scarcity premium.

In the case of our model winery, the low end of the range might be represented by the asset value plus customer list of $2,689,000 or $2,189,000 net of debt. This corresponds to a P/E of 20 times pro forma earnings, a cap rate of 8.1% and a premium over book value of 125%. The implied control premium over the suggested selling price of a minority interest is 56% (based on $1,400,000 total equity value).

The high end of this range is more difficult to assess and to rationalize in purely economic terms. It is a fact of life that economics are not the primary motivating force in small wineries. Chateau St. Jean's recent acquisition by Suntory for ap-

AMERICAN FUJI SEAL IS TOPS IN SHRINKSEAL CAPSULES.

THE COMPANY MEETING YOUR NEEDS IN STOCK MATERIAL, EQUIPMENT, NEW APPLICATIONS, SERVICE AND QUALITY.

Complete line of stock capsules for immediate shipment: 750ml or 1.5 liter sizes. Deep red, green or gold with high gloss or our exclusive "Matte" tin-lead like finishes.

Custom capsules: Exclusive Matte or Gloss finishes in custom colors. Up to 7-color, high-quality rotogravure printed logos and graphics. Can be embossed, stamped, perforated. Can be designed to fit unique contours.

Ideal upgrade from polyethylene push-ons at a very low cost.

American Fuji Seal is innovative in meeting your new and changing needs.

Automatic application equipment and heat tunnels for your common and not so common requirements.

American Fuji Seal ShrinkSeal capsules look and feel so much like tin-lead, customers virtually can't tell the difference.

Many wineries are taking advantage of this high-quality, lower-cost alternative from American Fuji Seal. Write or call for samples. We know you'll find us "Tops."

American Fuji Seal, Inc.

1251 N. Blue Gum St., Dept. W
Anaheim, CA 92806
(714) 630-0450

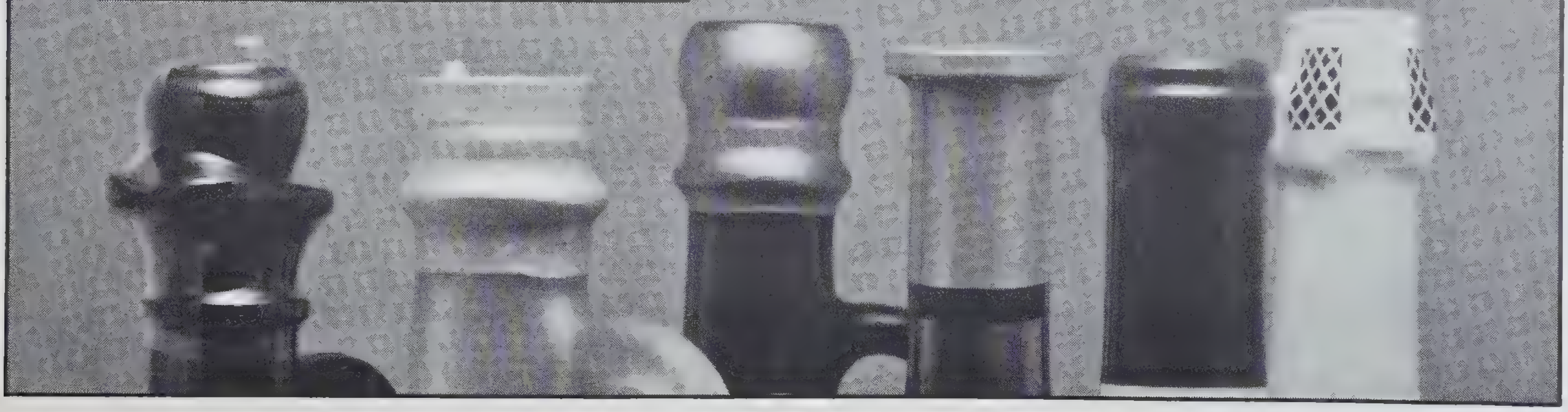


Table IV

Valuation of Customer List
($000)

Year:	1 & 2*	3	4	5	6	7
Case Sales						
Retail Accounts (60%)	9,000	6,750	4,500	2,250	---	---
% Current Sales	*100%*	*75%*	*50%*	*25%*	---	---
Restaurant Accounts (30%)	4,500	3,740	3,010	2,250	1,480	765
% Current Sales	*100%*	*83%*	*67%*	*50%*	*33%*	*17%*
Mailing List & Retail Sales (10%)	1,500	1,350	1,200	1,050	900	750
% Current Sales	*100%*	*90%*	*80%*	*70%*	*60%*	*50%*
Total Case Sales (100%)	15,000	11,840	8,710	5,550	2,380	1,515
% Current Sales	*100%*	*79%*	*58%*	*37%*	*16%*	*10%*
Dollar Value of Sales	----	$820	603	384	165	105
Profit Margin @ 34%	----	$279	205	130	56	36
Discount Factor @ 20% per annum	---	.62	.52	.43	.36	.30
Present Value of Profit Margin	---	$173	107	56	20	11
Total Present Value of Customer List	$367,000					

**Profit margin on sales in year 1 and 2 has been included in valuation of inventory.*

Table V

Value of Business Under Alternative Methods
($000)

Method	Value of Assets	Value of Equity*	Premium Over Book Value $	Premium Over Book Value %	Price/Earnings Actual	Price/Earnings Pro Forma	Earnings/Yield Actual	Earnings/Yield Pro Forma	Capitalization Rate
Book Value	$1,475	975	----	----	11x	9x	9.3%	11.3%	14.7%
Price/Earnings of 15x	$1,865	1,365	390	40%	15x	12x	6.7%	8.1%	11.6%
Capitalization Rate of 10%	$2,170	1,670	695	71%	18x	15x	5.4%	6.6%	10.0%
Asset Value	$2,322	1,822	847	87%	20x	17x	5.0%	6.0%	9.3%
Asset Value Plus Customer List	$2,689	2,189	1,214	125%	24x	20x	4.2%	5.0%	8.1%

**Value of assets less $500,000 of debt.*

proximately $40 million represents $333 per case capacity based on current production of about 120,000 cases. Simply applied to a 15,000 case winery implies a value of $5,000,000, and prices on this order of magnitude have been attained but the winery must have some very special features to justify this type of premium.

Evaluating the selling price of a winery requires a sophisticated analysis of all aspects of the business, including those intangibles, such as a unique reputation or showplace building, which can be exploited by a new owner. The buyer, on the other hand, should also assess the celebrity value of the owner, if applicable, and evaluate the negative impact this individual's departure will have on the business.

Finally, it must be emphasized that there are no hard and fast rules in this field and each situation must be evaluated on its own merits. Also, any transaction requires a willing buyer and a willing seller; and value, like beauty, is in the eye of the beholder. As with beauty, the packaging is important. If you are raising new equity or selling your business, package the offering with the same care and detail that you do your wine.

Richard Crichton is a financial consultant based in Napa, CA, the owner of Crichton Hall Vineyards, and a Director of Carneros Creek Winery. He was formerly a Vice President of The Morgan Bank in New York.

Don't prune us out!
Subscribe to
Practical Winery. Now.

BATF Wants Your Comments

A recent update of materials and processes authorized for wine production was generated from the wine industry, consumers and the Federal government. Modernizing the list helps eliminate barriers that have impeded access to foreign markets, and should eliminate confusion with consumers.

Following are highlights of Treasury Decision 182 and Notice of Proposed Rulemaking 543. Both documents were published in the Federal Register on Sept. 24, 1984. New regulations implemented by the Treasury decision will be effective March 24, 1985 and the comment period for the notice of proposed rulemaking closes Jan. 31, 1985.

Written comments to this notice are invited and must be received by Jan. 31, 1985. During the comment period, all interested persons will have the opportunity to provide additional comments regarding these specific treatments. Review of comments received in response to this notice will be a factor in BATF's decision whether or not to hold public hearings.

Treasury Decision 182 implements regulations which update the list of materials and processes which are authorized for use in the production and treatment of standard wine, juice, and distilling material.

Based on review of forty comments received in response to Notice of Proposed Rulemaking #413, published in the Federal Register on June 18, 1982, ATF is implementing regulations which generally will:

(1) Delete materials which are no longer in use in production and cellar treatment of standard wine.

(2) Delete materials which are used solely in wines produced pursuant to formulas filed with BATF.

(3) Add new materials and processes to the list of authorized treatments.

(4) Delete sodium treating materials.

(5) Delete all references to brand names.

(6) List treating materials by component ingredients under generic designations.

(7) Prescribe usage levels in both American and metric units of measure.

(8) Prescribe revised limitations on use and update FDA regulatory references.

(9) Establish a procedure for experimentation with new treatments.

(10) Revise procedures for obtaining authorization to use new treatments on a commercial scale.

In the notice of proposed rulemaking, which was published concurrently with the above Treasury Decision, BATF is seeking additional comments regarding the acceptability in 'good commercial practice' of certain materials and processes in the treatment of wine. Specifically, BATF is seeking specific comments regarding revisions of wine regulations in Parts 4 and 240 pertaining to:

(1) Use of activated carbon, hydrogen peroxide or an 'anthocyanase' enzyme preparation to reduce color in the juice of red and black grapes.

(2) Acceptability in good commercial practice of employing an ultrafiltration process utilizing membranes of various sizes

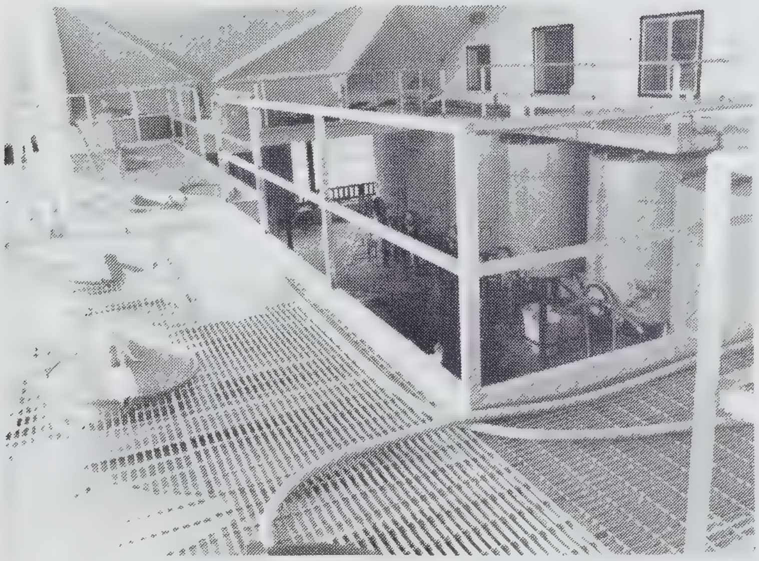
WINERY EQUIPMENT SYSTEMS
DESIGNERS AND MANUFACTURERS OF
EQUIPMENT FOR WINERIES

Tank Stands
Aluminum Cat Walks
Barrel Storage Systems
Stainless Wine Lines
Pumps

For further information:
(707) 257-1103

P.O. Box 3361
Napa, California 94558

Contractor's Lic. No. 439656



Aluminum catwalk constructed at Acacia Winery, Napa, CA.

to remove color pigments and proteinaceous material from juice and wine, including red wine.

(3) Use of maltol or ethylmaltol to treat standard wine.

(4) BATF's proposal, based on review of comments received in response to Notice of Proposed Rulemaking #413, to delete the alkyl esters of para-hydroxy benzoic acid (parabens) and propylene glycol, a solvent for parabens, from the list of authorized treating materials.

(5) Continued use of potassium benzoate to preserve wine.

(6) BATF's proposal to decrease maximum levels of SO_2 in wine from the across-the-board 350 mg/l to: For red and rose wines not more than 125 mg/l. For white wine, not more than 175 mg/l. For all wines containing 5% or more residual sugar may contain up to 275 mg/l (these limits are total SO_2 or sulfites expressed as sulfur dioxide).

(7) A proposed three-fold increase in the volume of water used in preparation of treating material slurries.

(8) Establishment in the standards of identity for wine of maximum levels for: Ethyl acetate of 200 mg/l. A maximum sulfide level, calculated as hydrogen sulfide, of 1 mg/l. A higher volatile acidity level of 0.15 g/100 ml for white wine and 0.17 g/100 ml for red wine produced from unameliorated juice having a minimum soluble solids content of 28° Brix.

(9) BATF's proposal that the authorized level of sorbic acid in finished wine be further reduced from 300 to 200 mg/l.

(10) A proposal to permit addition of authorized organic acids to a level of 9 g/l in white wines containing 5 or more g/l of sugar.

Comments to this notice may address any one or all of the proposals. Comments received on or before the closing date will be carefully considered. BATF will not recognize any material or comment as confidential and comments may be disclosed to the public.

Written comments should be sent to: Chief, FAA, Wine and Beer Branch Bureau of Alcohol, Tobacco & Firearms PO Box 385 Washington, DC 20044

Copies of both these documents can be obtained by writing to the above address or by telephone: (202) 566-7626. The documents should be referred to by their respective numbers.

new

The **BUCHER**

RPL 36

Grape Press

KLR BUCHER

BUCHER UNIPEKTIN SANOPLAST

KLR Machines, Inc.
47 West Steuben Street • (607) 776-4193
Bath New York 14810 • Telex: 510-252-1250

KLR Machines, Inc.
1925-B Francisco Blvd. East • (415) 456-4774
San Rafael, California 94901 • Telex: 380-753

BOTTLE PRICE FORMULA:

A Panacea or Anachronism?

George Schofield

Background

Vineyards in the Champagne region of France in the early 1900's were not very peaceful. Growers plagued by low prices were literally up in arms against vintners. Violence and riots were not uncommon. The brilliant mind and innovative leadership of Count Robert-Jean de Vogue, head of the Moet et Chandon estate, calmed riots by aligning interests of grapegrowers and Champagne producers. Over a number of years he guided the development and implementation of a grape-pricing formula which made grape prices a function of the market value of the wine.

In 1975, grape prices in Napa Valley, California plummeted for the second consecutive year. Cabernet Sauvignon grapes which had averaged $883/ton in 1973 fell to $340/ton, just slightly over levels of the late 1960's. The rollercoaster effect produced a bust-and-boom syndrome for both growers and wineries.

When faced with the aftermath of frost in 1970 and heavy rain in 1972, wineries bid grape prices for Cabernet Sauvignon grapes as high as $1,000/ton—in a frantic effort to meet wine demand. Unfortunately, few reviewed whether the economics of buying grapes at $1,000/ton and selling wine for $5/bottle retail worked out. By 1975, the results were evident. It didn't.

The Napa Valley Cabernet Sauvignon crop of 1973, 1974, and 1975, were all in the range of 20% above normal, with each setting new production high-water marks. Under the pressure of growing winery inventories, woeful financial results, and surplus grapes, the market price of Cabernet Sauvignon and other grapes in Napa collapsed. Thus, growers faced the dismal financial realities of grape revenues insufficient to service debt and, in some cases, below out-of-pocket farming costs.

Concept Development

In 1977 another creative leader, Robert Mondavi, took a bold step in addressing the bust-to-boom cycle of grape prices in Napa Valley. He was particularly anxious to replace the acrimony of annual price negotiations with individual growers and ad hoc committees with harmony and goodwill. Refining the concepts of Count de Vogue, Mondavi attempted to align the interest of growers and his winery by correlating the welfare of both parties to the retail wine marketplace. After a two-year study, a relatively simple formula was developed for valuing grapes based on the price the winery received for its bottled wine as sold to the public at the winery.

In essence, the grower and winery were both to give up the benefits and risks of the dynamic spot market for the security of a middle ground. From an agreed starting point, their joint welfare would depend on the price the winery could get on its bottled wine, rather than fluctuations in the volatile local grape market. Rather than gamble, both could plan their operations with the major risk factor of grape prices under some semblance of determinability.

CRIVELLER COMPANY

supplier to

SMALL & LARGE WINERIES

WITH

- GRAPE PROCESSING EQUIPMENT
- FILTRATION EQUIPMENT
- BOTTLING EQUIPMENT
- EQUIPMENT FOR TREATMENT OF JUICES AND WINES
- STAINLESS STEEL TANK ACCESSORIES
- PISTON PUMPS
- CHEMICALS & FILTER SHEETS
- YEASTS AND ENZYMES
- OENOCYANINE AND OTHER SPECIALTIES....

CANADA
6863 Lundy's Lane,
NIAGARA FALLS, ON.,
L2G 1V7
Ph. (416) 357-2930

U.S.A
P.O. Box 162
Lewiston, N.Y.,
14092

Telex 061-5446

Wine East

The lively magazine that keeps you up-to-date on the news of grapes and wine in Eastern North America.

With 325 wineries located between the Rocky Mountains and the Atlantic Coast, wine professionals and consumers are discovering the importance of keeping informed about this rapidly expanding wine region. Published bi-monthly, *Wine East* contains winery profiles, in-depth features on Eastern grapes, wine and winemaking, and human interest stories centering around Eastern wine people.

Subscription rate: $10.00 for one year ($15.00 in Canada and overseas, payable in U.S. funds)

Write for a free sample and/or a list of other publications available about the Eastern wine industry.

L & H Photojournalism
620 North Pine Street
Lancaster, PA 17603

Eastern Wine Publications

FINE QUALITY
WOOD BUNGS

Clear Douglas Fir
Clear All Heart Redwood
Tank Grade American White Oak

—Made To Your Specifications—

Buy Direct and Save!
Quantity Discounts
(One Size 250 or More)

Direct Shipment to Your Winery

GENE K. NELSON
12786 Old Redwood Hwy.
Healdsburg, CA 95448
707-433-5138

MANUFACTURER OF WOODEN PRODUCTS

CALIFORNIA REPRESENTATIVE
FOR FRENCH COOPERAGE BY
Les Tonnelleries de Bourgogne and
Tonnellerie Vicard

Partnership

Growers and the winery were to become partners, in the sense that both benefitted in the same direction from consumer price changes. If the winery raised its retail price 10%, the grower could look forward to a similar increase. On the other hand, if competitive pressures forced the winery to reduce prices, a corresponding percentage decrease would occur in grape costs.

A related change in grape-pricing, which further aligned the interest of growers and wineries, was to increase leveraging of grape payments by greater sugar bonuses and penalties for optimal quality grapes. Rather than 15% over a wide band, the parameters were changed to 40% or more over somewhat more restricted criteria. This revision fostered a farming approach more atuned to quality than pure production volume.

Pricing Factor

Obviously the key to a bottle-price formula was determination of the pricing factor by which the retail price of the wine would be multiplied to arrive at a base grape price. This factor would be fixed over future years. For example, if a factor of 100 was determined for Chardonnay and the retail price/bottle was $10, the base grape price would be $1,000/ton. If, in a subsequent year, the retail price increased to $11, the grape price would be $1,100 (100 X $11).

Since each grape variety and wine was unique, a complete economic review had to be made from the viewpoints of both grower and vintner. The basic concept was that both parties deserved a fair return on their capital and expertise. Factors such as yield/acre, yield/ton, ageing time, barrel requirements, capital investment, farming, wine production costs and a host of other considerations had to be integrated. Through a series of economic simulations, the effects on both winery and grower and various factors for each grape variety was projected.

Limitations

The bottle-price formula was not to be a universal panacea. In some cases, such as Gamay and Pinot Noir, a factor could not be developed which made economic sense to either party. With relatively low retail prices for certain varietal wines, neither grower nor winery could obtain a reasonable return. Even where the factor provided equilibrium, concerns were raised about data uncertainties or new technological developments which might significantly alter relationships over time.

In the midst of reservations and skepticism, great courage was exhibited by Mondavi in 1977 by proposing a three-year trial program. Other boutique wineries and sparkling wine producers had pioneered with similar programs, but the 1977 announcement, because it involved a major winery, was a significant milestone.

Achievements

Besides being a public relations coup and a demonstration of positive leadership, the 1977 experiment by Robert Mondavi achieved the following:

1. A spirit of cooperation between grower and winery emerged, and growers developed more interest in the quality of the wines and the image of the winery.
2. Some progress was made on achieving a better and more stable sharing of financial returns between winery and growers.
3. By giving growers a more secure return, a blow was struck for the survival of the Napa Valley vineyards, particularly against urban development.
4. A ceiling on grape costs and a floor on grape revenues provided the winery and growers a better basis for planning their operations.
5. Credit ratings were improved and financing facilitated for both the winery and growers.

6. The ability to share in wine price increases afforded the grower a chance to offset inflationary cost increases.

7. The availability of a unique program attracted many new quality-oriented growers to the winery.

Practical Problems

Despite these advances, by the mid-1980's, a real challenge was posed to the viability of the bottle-price formula concept. The repeal of fair-trade wine-pricing legislation in California in 1978 had a particularly dramatic impact on retail wine-pricing practices. Wineries lost direct control over consumer pricing. This effect was further compounded by stagnation in demand, rising competition from imports, and two huge bumper crops in 1980 and 1982. Heavy price-discounting and sales promotion expenditures radically changed the profit margins of the winery and the basic bottle-price relationship.

One of the prime difficulties of the bottle-price formula has been hindsight reviews. Like any hedging alternative, one party can look back and regret not taking advantage of the free market. The other party, who in reality benefitted from the commitment, usually is content to be silent.

So far the economic benefits have largely been favorable to red wine grape-growers due to weakness in the spot market prices. A strange feeling of unnecessary largesse tends to develop in such circumstances, particularly if the difference grows consistently and significantly over time.

A related competitive problem can be created when other wineries are perceived in some fashion to be taking advantage of lower grape prices. Of course, wine prices can be lower, but the impact on grape savings and competitive position may be delayed up to one year. Meanwhile, financial losses or reduced market share can result.

Future

At this juncture, continuation of the bottle-price formula seems unclear. The one major advocate is going through a complete re-evaluation of its commitment. In the wake of spot market weakness, other wineries have not adopted similar programs. This timing problem has been compounded by pragmatic reservations about hedging. The bottle-price concept, therefore may well be characterized as an anachronism in the unusual sense of being ahead of its time.

It is unfortunate that the financial benefits from the 1977 experiment have been lop-sided. However, the plight of the vineyard is being overlooked. If the dismal economic picture for vineyards continues, the production of high-quality premium grapes may be at stake.

Conclusion

Essentially, the bottle-price formula became a prop to grape price levels, which in certain cases fell below the economic justification point of premium-quality viticulture. If vineyards are lost, growth in demand resumes, and crop levels return to normal, the pendulum, at least for the highest quality premium varieties, could swing to shortages and high prices. Hence, the wineries could be both short of sight and memory.

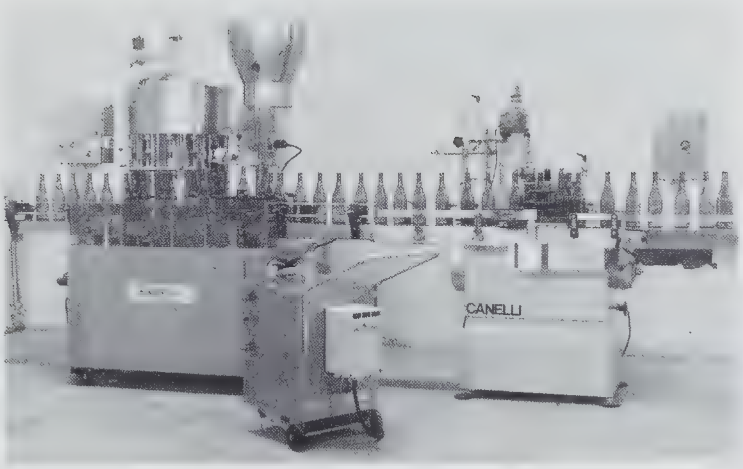
With all the side-benefits of a pricing partnership between wineries and growers, it would be tragic to see a noble experiment fail for lack of patience and foresight. The welfare of both the premium vineyard and wineries may collectively be at stake. Hopefully, all interested parties will recognize that not only is financial success involved but basic survival. Bust-and-boom cycles will result in needless casualties.

If wineries want to be assured of the long-term availability of the highest quality grapes, they will either have to own the vineyards themselves or provide some sort of grape-pricing mechanism which avoids periodic financial crises for independent growers.

Moreover, since some wineries will also not be able to weather the storm of abnormally high grape prices, their own security is intricately involved. With joint interests interwoven, logic shouts for the continuation of some sort of grape-pricing arrangement based on mutual long-term welfare, rather than individual short-term profits.

Fischer & Schug
Winery Equipment

Rauch Stemmer-Crusher
Membrane Presses
Plate and Lees Filters
Schneider Pumps and Mixers
Semi-Automatic and Automatic
Bottling Equipment
Please inquire about Used Winery Equipment
Sales, Parts & Service
940 Dowdell Lane
St. Helena, CA 94574
(707) 963-7000



Bottling Line Installed at Whitehall Lane, St. Helena, CA

Roguing Out Eutypa Pays Big Dividends

Pat Summers

Bill Ward's first year as manager of Chappellet's 105-acre vineyard above the Napa Valley in California turned out to be a big surprise for the man he worked for and for the men who worked for him. Ward began pruning season by cutting off five and six-inch diameter cordons with no sense of guilt at all... 'roguing out the *Eutypa*' was what he called it.

In the Spring of 1980, Ward identified *Eutypa* as the disease seriously affecting a 22-acre, then 14-year-old, non-irrigated, cordon-pruned Chenin Blanc vineyard. The vineyard produced 34 tons that first harvest he was in charge and then he noted in the Chenin Blanc tell-tale signs of stunted shoots.

Ward recalled, "By mid-May, we found these shoots were very, very compressed. They were just like photographs in *Grape Pest Management* (published U.C. 1981)... real stunted, funky looking leaves with internodes ¼ - ½ inch long.

"By June you have maybe four inches of growth, if it is still alive then. The only thing I have ever seen that comes close to looking like *Eutypa* is early season thrip damage but by mid-May there is no confusion, the difference is obvious. Even earlier in the season, if you looked at a few of one, and a few of another, you can pretty much tell the difference." The other classic identification, the pie-piece-shaped canker was there too. This becomes visible when cutting across the cordon reveals a dark wedge in the circle of healthy wood.

Eutypa armeniacae, commonly known as *Eutypa* dieback is a disease identified by the late Dr. William Moller and Amand Kasimatis in 1975 which appears to strike only apricots and grapes. There are both asexual and sexual forms of the organism. The sexual 'perfect' is called *Eutypa* and the asexual or 'imperfect' form is known as *Cytosporina*. The *Cytosporina* form is found in the San Joaquin Valley of California and appears to come in with western storms.

The rain wets spore-bearing surfaces where they are, along the coast, and they are discharged into the air. These spores then move with the storm into the inland valley. Those that fall on fresh (1 to 5-day-old) pruning wounds can cause infection, however, they do not spread further from vine to vine. Any other infections must again come from spores from the coast, repeating the pattern with future storms. Range of the spores has been determined to be at least 75 miles.

In the North Coast of California where the annual rainfall is greater, the pattern is different. Here the perfect stage is present. During and shortly after rain, the spores infect fresh wounds on the vines and, in a few years, repeating the life-cycle, can again be spread. About the only regions in which this disease is not found yet, is in the area north of Sacramento and in Southern California.

Moller and Kasimatis have done considerable work in making this disease distinguishable from other problems such as *Phomopsis viticola* (formerly Deadarm), Pierce's Disease, spindle shoot, fan leaf virus and even a deficiency of zinc. All of these show similar symptoms of stunted growth, except Phomopsis which displays leaf spotting and shoot cankers. To add to the confusion, some of these diseases are more evident after a heavy rainy season, just as is *Eutypa*. None of them show the wedge-shaped wood necrosis.

Bot Canker (*Botryodiplodia*) is the most recent look-alike to be found in the North Coast (and is found to be present in every major grapegrowing area in California) also has wedge shaped wood discoloration, but it does not show the stunted, spring shoots of *Eutypa*, according to George Leavitt, Madera County farm advisor. Leavitt spent the 1983-84 winter on sabbatical isolating this recently identified disease and has found that previously identified *Eutypa* is often Bot Canker instead.

In his samplings for instance, he found in Sonoma County, of 81 vines thought to have *Eutypa*, only 30 did, and in fact 23 had *Botryodiplodia*. In Napa County there was slightly more *Botryodiplodia* than *Eutypa*. In Mendocino County there was slightly more *Eutypa*, but the figures were all fairly close.

To further complicate diagnosis for the vineyardist, Leavitt says, "Out of 500-600 isolations that I made last winter, probably 12 of them gave me pure *Eutypa* cultures off of the right side of the canker, and pure *Botryodiplodia* off of the left side of the canker." Samples of the infected vines were analyzed in a laboratory. According to Leavitt, on potato-dextrose agar, bot canker shows a greenish color, while *Eutypa* is signaled by a whitish color.

"I have seen *Botryodiplodia* move faster than *Eutypa*, this is my observation." Leavitt is cautious with this early work, "It seems to move a considerable distance ahead of where the dead area is. I have been able to isolate it from arms where it looks healthy but, when I split the wood, there are all kinds of dark streaking through the vascular system, I can't always isolate it from that dark streaking area, but often I can. Why, I don't know yet.

"We don't know the why and wherefores of the pathogenicity of either one of these organisms." Leavitt explains, "We don't know, for example, does *Eutypa* send out a toxin which weakens or kills the cells and then invades it afterwards? We haven't even isolated the toxin yet. We don't know what causes that funny foliar growth that you get with *Eutypa*."

By the time Ward found the infection at Chappellet, the world was just becoming aware of the *Eutypa* problem. The solution for some was costly—ripping out the entire vineyard. For others, it was a more timid approach: cutting back cautiously. Ward developed his own solution.

The first year he cut off some beautiful cordons. Using the wisdom of the day, he cut just past the necrotic area, leaving only clean wood. He was surprised to note that two years later he was getting a reinfection of the vine. Since it is generally felt that pruning implements are not carriers of *Eutypa* he concluded that he did not cut deeply enough.

"What I was taught at U.C. Davis is when you make these cuts, all you have to do is go behind the pie-shaped canker. You cut back to where it is clean. Now, I don't know what is going on. I don't know if it is the seriologic response inside the vine, or how far back it goes.

"But I do know, if you don't cut far enough back, even if you are into clean wood, then you only wait one or 1½ years, and what you thought was clean was in fact not clean and the spur positions from that point, moving back towards the head, annually just start declining."

Doug Gubler, U.C. Davis extension plant pathologist, says preliminary work that he and Kasimatis did of taking 30 samples in the spring of '84 showed that they could not

Roguing out Eutypa leaves little place for the vine to push new growth.

isolate the organism at any point past the necrosis. Based on that, Gubler advises today that cutting one centimeter beyond the wedge is enough.

Ward's own experience tells him differently. "Instead of just one spur position, or right behind that, you have to come back a good 12 inches. This is just my experience here that tells me this. If I don't, it will pop up within the next 24 months. Then I have just been spinning my wheels for that much time. In the meantime I have not laid down good wood, and haven't rejuvenated the vine the way it should have been.

The new investigation by Leavitt would lead one to believe that Ward and others dealing with this problem just might have more to be concerned about than just *Eutypa*. However, Ward is basing most of his preliminary diagnosis on the visual signs in Spring—stunted growth. This has not been a symptom associated with bot Canker.

"The first year it was almost kind of funny. It was like pulling teeth to get the crew to make those big cuts. They would say, 'Bill, we are cutting off all this wood!' I would answer, 'Yeah, but only half of it is worth a damn, and if we don't, two years from now the other half won't be worth anything either.' The old wood certainly looks impressive, but esthetics don't pay the bank."

Ward's regime starts each spring with head suckering, a practice Ward believes in for its own merits. "If you sucker in the spring, those shoots that you take off don't leave as large pruning wounds as they would if you left them until winter."

About mid-May, Ward's crew makes its first pass. Each vine with signs of stunted growth is marked at the position of the affected node. There is the decision then to cut it off during the growing season, or wait until winter pruning. Ward prefers to wait.

"If I have one, two or three growing points out there, they might give me some fruit. The nice thing about *Eutypa* is that it does move rather slowly on the vine, so I can afford to wait until later. I am not really losing but more than ½ - 1 inch by waiting." On the other hand, he recognizes merits of the other side of the argument. "If you go ahead and lop it off in the spring growing season, the stuff you are retaining just takes off.

"Also important is that the suckering crew do not take off any suckers or regrowth at the head." Ward adds, "We need to get them up and make sun canes out of them." Everything is left until the pruners come through so they will have the best selection possible to lay down for the following year. Because the suckering crew must slow down and think about this problem there is extra cost. Ward estimates the cost is about $15.00/acre.

Winter pruning is probably the more important part of the schedule. Ward schedules pruning of infected vines last. Kasimatis' experience has shown that late pruning substantially decreases *Eutypa* infection. The men work with folding handsaws. Chainsaws were originally used, but according to Ward, "They tend to get messed up with the wire, especially on the big fat cordons that may be wrapped around the wire."

With tape marking the stunted shoot closest to the trunk, the pruner cuts back a full 12 inches closer to the head, or even into the head. Then, taking whatever looks like the best sun cane, he lays it out for a new cordon. Or, if the cordon is still partly intact, he simply extends the best terminal shoot.

Pointing to one less-than-perfect new cordon being formed he says, "I would rather they had come back closer to the head then they did in this particular case and get rid of

BARREL BUILDERS NAPA VALLEY

NAPA VALLEY'S OLDEST COOPERAGE

BARREL BUILDERS

SOLE REPRESENTATIVE FOR

BOUTES & CO. FÛT FRANCAIS

- WE SPECIALIZE IN QUALITY BARREL SHAVING AND REPAIR
- WE BUY AND SELL USED COOPERAGE

1085 LODI LANE, ST. HELENA, CALIF. 94574 (707) 963-7914

Sacrificing a cordon of large girth proves cost effective.

that big bow, but esthetics don't pay the bank." And more important, after two years of intensive training his pruners know the concept and will get him good wood, one way or another. To bring in some crop until the cordons are fully out and functioning Ward may leave a few double spurs. Certainly the massive vines can handle it.

Ward and three permanent employees do the pruning. The last hour of each day one employee sprays Benlate (1/5 lb/gallon) on all cuts made that day. "He just has a backpack which holds about three gallons and he really does move. When we get to where we have made major cuts, he will take time, slow down a little bit, to make sure he got that specific location. It all gets back to economics, we are trying to clean this thing up. If he goes too fast, what's the point?"

Pruning costs are also a little higher. Ward figured it cost about $225/acre to prune Chenin Blanc in 1984. That figure includes extra time needed to prune on a very steeply terraced vineyard. Overall additional cost tacked on to normal pruning time would be about $65. Pruners themselves are expensive, Ward figures with pay and benefits (all are permanent employees) they get about 40% more than a pruner called in for the day. There is also the cost for saws, about $7.00 each. With permanent employees there appears to be little need for replacements.

So what is the payoff? Well, because he has not ripped out the vineyard, he has some crop. But, Ward has increased the yield from 34 to 90 tons in 1983. The 1984 yield was 88 tons, however this block went into the season with only six inches of rain after January. Ward felt it prudent to thin this and all the non-irrigated blocks, estimating a loss of 14-18 tons in this process. The 1984 harvest came in a full five weeks early.

Chenin Blanc at that time ranged from $500-$600/ton. It would certainly seem that it would prove to be cost-effective to spend this much more time and money to produce an additional 56 tons. But more remarkable is that when he first started, he was cutting back about 5,000 to 6,000 vines out of the total 10,000. In the spring 1984 pruning, there were fewer than 1,500 vines with cuts.

Ward has listened to the arguments from his peers that it doesn't pay to try to renovate the old *Eutypa*-ridden vineyard. He just doesn't buy it. When Ward arrived there was a 14-year-old vineyard with massive cordons producing 34 tons. Now, after four years of 'roguing' there is an 18-year-old vineyard producing close to 100 tons.

Massive cordons are gone, replaced by three, two and one-year-old wood, producing well, and promising to produce even more. Ward explains, "What good is a piece of wood six inches in diameter that has 12 growing points on it, and only three are alive? It serves no purpose." But it doesn't pay to throw away the entire vineyard either.

Rate of Change in Yields

Year	Tons
1980	34
1981	57
1982	71
1983	90
1984	88*

*Heavy thinning took 14 - 18 tons.

WINE BOTTLES BOUGHT & SOLD
GLASS STERILIZATION
NEW CARTONS & DIVIDERS
ENCORE! (415) 234-5670
860 So. 19th Street, Richmond, CA 94804

"I read it in
PRACTICAL WINERY!"
Each time you reference PW,
our foundation becomes a
little stronger.

Ultrafiltration

Ultrafiltration Defined

Ultrafiltration (UF) is a recent technological development for the winemaking industry. It offers the winemaker a unique tool to physically separate high-molecular-weight substances, particulates, and microorganisms according to their size. With UF, fining steps, diatomaceous earth filtrations and lees-recovery operations may be partially or totally eliminated. UF can remove a variety of off-components such as tannins, proteins and unwanted colloids.

Ultrafiltration is a tangential-flow membrane filtration process for separating molecules on the basis of size under pressure as a driving force. UF membranes differ from microporous (MF) membranes both in structure and operation.

Microporous membranes (Fig. 1) have essentially the same structure throughout. (Figures 1, 2, 3 & 4 on p. 28.) Particles larger than the rated pore size are retained on top of the membrane while those smaller may enter certain pores and either pass through or become trapped within the filter's inner structure. Fluid flow is usually perpendicular to the membrane surface in a 'dead-ended' fashion. When an MF membrane has plugged it is replaced with a new membrane.

UF membranes (Fig. 2) have a very 'thin-skinned' surface facing the flow. The remainder of the membrane acts as a very open-pored support structure. Molecules passing through the skin layer encounter very little resistance in the substructure. With UF membranes, fluid passes across the surface of the membrane in a tangential-flow mode (Fig. 3).

High flow velocities across the surface of the membrane minimize plugging by retained material and provide a continuous cleaning of accumulated debris. Only a portion of the fluid passing the membrane flows through it. The remainder is recycled and repeats the circulation loop.

MF membranes are characterized for retention by their normal pore size. UF membranes are rated according to the nominal molecular weight of the molecules they retain. UF membranes are available from 1,000 to 1,000,000 Nominal Molecular Weight Cut-off (NMWC). Most UF membranes are cast from tough, chemically-resistant polymeric materials. Regeneration is accomplished with common cleaning agents such as sodium hypochlorite and caustic soda.

UF membrane modules are unlike most filtration devices found in a winery, such as pad, cartridge, and pressure-leaf types. UF modules are constructed by alternately layering membranes and spacer screens on top of one another, and then wrapping the assembly around a hollow, perforated, cylindrical core. The fluid flows tangential to the membrane surface, parallel to the long axis of the cartridge (Fig. 4). These modules, called spiral wound cartridges, permit a large area of filter to be packaged in a small volume. Membrane lifetimes can run as high as 10,000 hours.

J. Lohr Winery Application

Barry Gnekow

In 1981, we (J. Lohr Wines, San Jose, CA) purchased a process ultrafiltration system from Millipore Corp., Bedford, MA. The original system processed approximately 7 litres/minute, and cartridges and hardware have been purchased to double the system's capacity.

The initial reason for investment in a process UF system was recurring heat stability problems with our Sauvignon Blanc bottlings. The 1976 vintage originally required approximately 8 lbs./1,000 gal of bentonite. Bottling was postponed and when I re-checked for heat stability prior to a new bottling date, the wine contained a little precipitate and, therefore, failed our test. (Test consists of filtering a sample through a 0.45u membrane, boiling it for three minutes, and examining the sample for haze in a high intensity light 24 hours later.

I fined with 1 lb./1,000 gal of bentonite and the wine tested stable. Again, bottling was postponed and the wine failed another heat stability test before the next scheduled bottling date. Protein instability was spontaneously occurring in the tank. That Sauvignon Blanc was finally blended into our Chenin Blanc.

We had problems again with the 1979 vintage and I pulled some 2,000 cases off the market. The problem continued. We sold some of our 1980 Sauvignon Blanc in bulk as the amount of bentonite required to stabilize the wine would have left it tasting like water. The 1981 vintage would have required 14 lbs./1,000 gal to achieve heat stability. We tried other methods including heating the must and adding enzymes, but with no success. It was then that I heard about ultrafiltration.

We had 6,000 gallons of the 1981 Sauvignon Blanc that we not only wanted to be heat stable, but also to taste good. Our goal was to have approximately 2,500 to 3,000 cases of varietal wine for sale on the market. The winery owners agreed that a UF system would be purchased if it met winery objectives. We chose a 10,000 NMWC membrane over 1,000 and 100,000 NMWC membranes. The 1,000 NMWC membrane produced a significant difference in body, while the 100,000 NMWC did not provide the heat stability required.

We started the UF system and filtered approximately 20% of the 6,000 gallons, and then performed a blind taste test. The samples included a control, wines fined with two different levels of bentonite, and an ultrafiltered wine sample. Our main concerns were the body of the wine, the overall quality, and the nose. I was sure I would pick the control wine over both the bentonited and UF-processed wines. However, the wine with a cleaner nose and better body—the wine I chose—was the ultrafiltered wine. We purchased the system and ultrafiltered the entire batch.

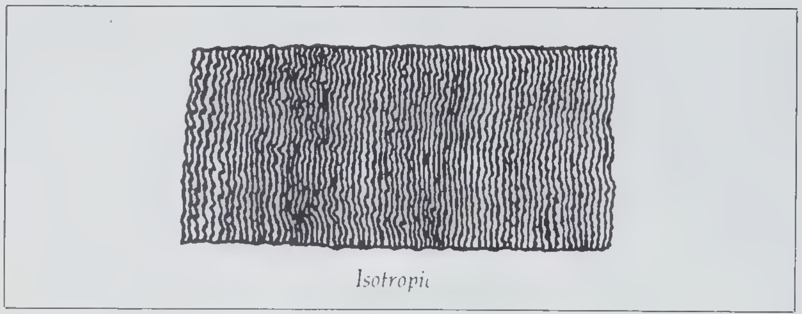


Figure 1

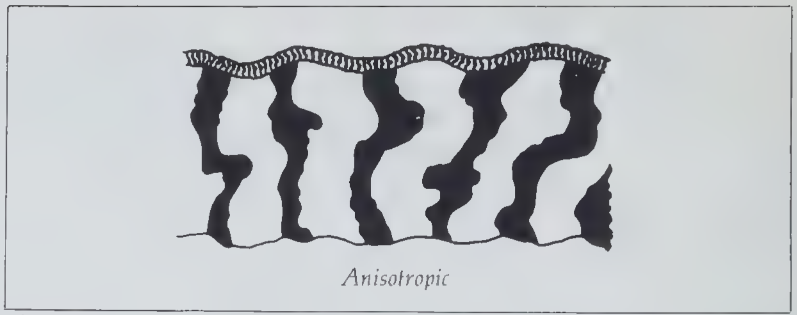


Figure 2

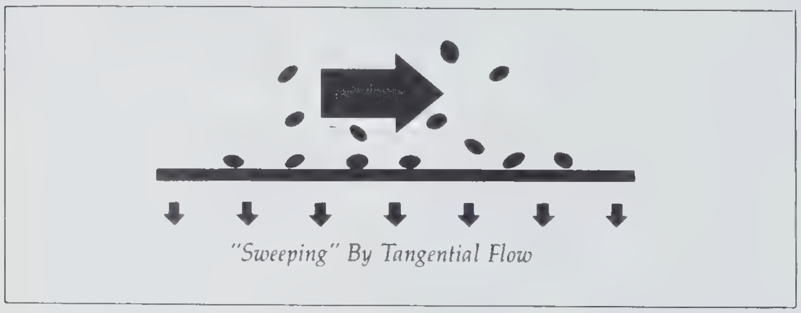


Figure 3

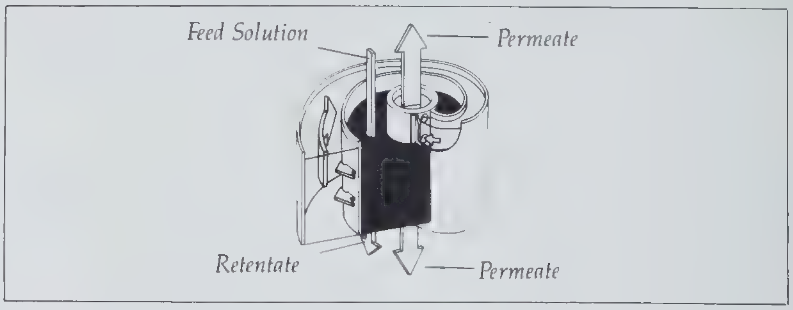


Figure 4

Additional J. Lohr Ultrafiltration Applications

Since our first successful employment of ultrafiltration, we have used the equipment for several other applications:

- *Press wines from Chardonnay, Pinot Blanc, and Sauvignon Blanc*

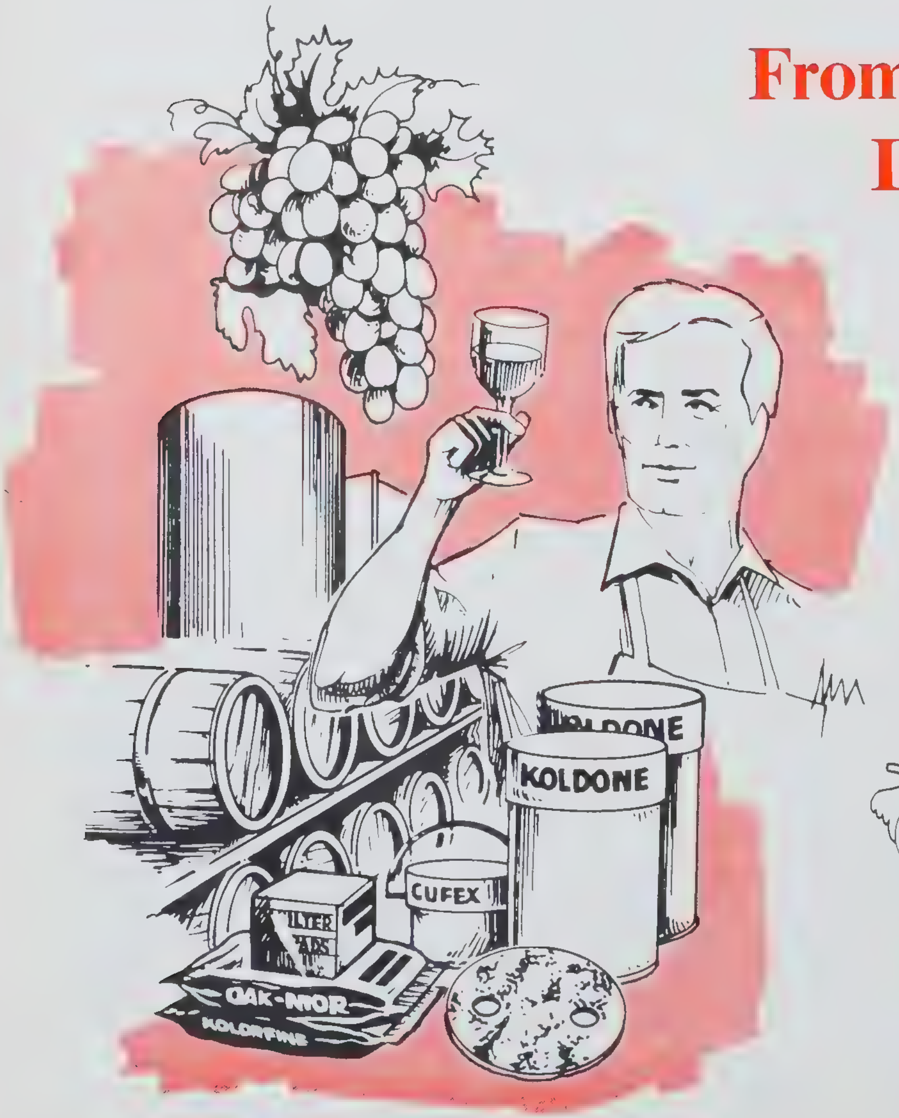
Press wines are always slightly brown due to higher levels of oxidized phenolics. All of our press wines are ultrafiltered to remove brown pigments and to make them heat stable. UF also removes the slight bitterness from phenols. UF produces a much cleaner wine than we could obtain from common fining agents such as casein, isinglass, gelatin, or PVPP.

- *Blending components for table wine*

We produce a certain table wine in large quantity for which we buy blending components on the bulk market. Frequently, these purchased lots are ultrafiltered to remove browning and tannic-related 'off-characteristics'.

- *Johannisberg Riesling, 1982 vintage*

Our 1982 botrytised Johannisberg Riesling caused clogging of our 0.45*u* final membrane filters at bottling. In spite of DE



From the Grape to the Glass, Let Us Work for You.

Our complete line includes:

- Filter sheets for rough and polish filtration
- Cellulose fibers in various grades for use in pressure leaf filters
- Agents for clarifying, cold stabilizing without refrigeration, acid reduction, color removal, color stabilizers, correction of excess metals, correction of H_2S or mercaptan odors
- Granular white oak to complement and enhance fine wine flavors and aromas
- Novo Enzymes (liquid and dry)

Cellulo Company
A SUBSIDIARY OF FILTER MATERIALS INC
Cellulo®
and its

Finer Filter Products Division

West Coast Office: 124 "M" Street • Fresno, CA 93721 • (209) 485-2692
East Coast Office: 27 North Ave. East • Cranford, N.J. 07016 • (201) 272-940

and pad filtration, membranes would clog within 4-5 hours. We ultrafiltered 50,000 gallons with extremely high recovery (only 60 gallons of lees) and found that the Riesling no longer clogged the membranes. We ultrafiltered 77,000 gallons of the 1983 vintage (containing more rot or botrytis) with similar results. In addition, UF removed off-odors from the secondary molds in the rot/botrytis, and has produced a cleaner nose.

- *Cabernet Sauvignon, 1977 vintage*

We had 16,000 gallons of oxidized Cabernet that could not be sold even on the bulk market. We ultrafiltered this wine and obtained 14,000 gallons in which one could smell oak and the aged character, but the wine no longer had an oxidized character. We blended it with some 1981 and 1982 Cabernet, and the wine won a number of medals in the 'Cabernet under $7.00' category.

- *Lees recovery*

We generally combined all winery lees (with up to 50% solids) from our centrifuge in one tank, and sold the lot as distilling material for $.10-$.23/gallon. We now filter all lees-press and centrifuged lees with the UF system, and the filtrates can be blended at 10-15% into white table wine. This saves us from having to sell some 6,000 gallons as distilling material annually.

- *Light body, low alcohol wines*

We make certain wines, such as Riesling, Chenin Blanc, and a proprietary blend called Jade where we are interested in obtaining a light body feel, low-alcohol, and a delicate mouth feel. We are trying to produce something smooth and very easy to drink. Ultrafiltration removes by-products of botrytis, a glycerol character which is undesirable in such wines.

There are other applications of great interest which we have not yet had the opportunity to evaluate. Hard press juices could be ultrafiltered prior to fermentation to increase the yield/ton of high-quality juice. Ultrafiltration could also be used to increase the tannin content in red wines with poor body or mouth feel. In this case, the product would remain upstream of the membrane and its character would be improved. The filtrate wine could be blended into other red or rosé products.

Conclusions

My first responsibility as a winemaker is to make wine that tastes good. I come from the UC Davis school of winemaking which teaches you not to do anything to a wine unless it is needed, since almost anything you do takes away from the quality.

When we bought the ultrafiltration system to heat stabilize Sauvignon Blanc, UF was not a choice. I **had** to try it. To my surprise, it made a better wine than we could have made with bentonite. Since then, we have ultrafiltered many other wines as described above.

Several of these have been entered into competitions and have won awards. When I look for verification that I am a good winemaker, I look toward those competitions to see the judgement of my peers—other winemakers. Ultrafiltered J.Lohr wines have received high marks. Our 1982 Johannisberg Riesling and the 1982 Sauvignon Blanc each won two medals. A non-vintage Cabernet we made with 40% ultrafiltered wine won two medals.

The UF system requires very little labor or direct supervision. The same set of membranes has lasted 3,500 hours already, processing over 270,000 gallons of wine. The UF system is easy to operate and maintain. The supplier (Millipore) has provided even more technical support and assistance than we anticipated. It would not surprise me to see many other wineries throughout the world to begin using ultrafiltration in the near future.

GROSKOPF WAREHOUSE

P.O. BOX 128, VINEBURG, CA 95487
20580 8TH STREET EAST, SONOMA, CA 95487
(707) 996-2113 • (800) 221-0229

A 107,000 square foot wine storage and distribution facility easily accessible from all California wine producing areas, main intrastate and interstate highways, and the San Francisco bay area.

- Bonded wine cellar No. 5147.
- Fully insulated/temperature controlled (60°F. mean temperature).
- Truck level loading dock and ground level doors which facilitate the loading and/or unloading of flatbeds inside the building.
- Bonded and tax-paid wine storage and distribution.
- Tax-paid distilled spirits storage and distribution.
- Empty glass and packing spirits materials storage.
- Computerized inventory control and reporting.
- ABC and BATF experienced staff.
- Interstate and intrastate shipment consolidations.
- Import containers drayage and trucking services.

NORTHEASTERN UNITED STATES

Acidity and pH Control

Leonard R. Mattick
Department of Food Science & Technology
New York State Agricultural Experiment Station
Cornell University, Geneva, New York

One of the major problems facing winemaking in northeastern United States and Canada is acidity, caused by climatic conditions and short growing seasons. The two major acids in musts and wine are tartaric and malic. These acids are dibasic hydroxy acids which can and do exist as free acid, the mono-anion or acid salt, and the salt. Thus there is an equilibrium of these acids, acid salts, and salts in the juices. The formulae below show this equilibrium between the forms of the acids.

$$\begin{array}{rcccl} & K_1 & & K_2 & \\ \text{acid} & \longleftrightarrow & \text{acid salt} & \longleftrightarrow & \text{salt} \\ \text{malic acid} & \longleftrightarrow & \text{bimalate ion} & \longleftrightarrow & \text{malate} \\ \text{tartaric acid} & \longleftrightarrow & \text{bitartrate ion} & \longleftrightarrow & \text{tartrate} \end{array}$$

This equilibrium is pH dependent as can be expressed by the Henderson-Hasselbach equation as shown below:

$$pH = pK_1 + LOG \frac{[\text{acid salt}]}{[\text{acid}]}$$

$$pH = pK_2 + LOG \frac{[\text{salt}]}{[\text{acid salt}]}$$

Figures 1 and 2 show the equilibrium between various forms of malic and tartaric acid, respectively between pH 3 - 4. Fig. 3 is a composite of the two. From this you can observe that malate has a larger contribution to the acidity than the tartrate. For example, assume an equal concentration of malic and tartaric acids in a juice at pH 3.3. Malic would be 55% as the free acid at pH 3.3, while tartaric would be 27%, a ratio of 2:1.

All figures and tables on pp. 36-38

WATER SUPPLY AND WASTEWATER
ENGINEERING FOR WINERIES

DAVID R. STORM, Ph.D., P.E.

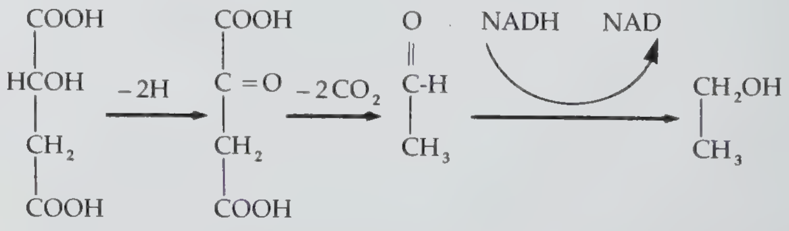
STORM ENGINEERING
(916) 795-3506
15 MAIN ST., P.O. BOX 681, WINTERS, CA 95694

All acids and their salts are soluble in the alcoholic solution of wine, with the exception of potassium bitartrate. This acid salt is partially soluble. Its solubility is affected by the pH, temperature, and concentrations of potassium, tartrate and alcohol. Further, since potassium bitartrate is a slightly soluble substance, the amount in solution can be expressed:

$$K_{sp} = [K^{+}]\ \ [HTa\ ]$$

Therefore, the tartaric acid will be lowered by normal precipitation of potassium bitartrate during tartrate stabilization of a wine. The amount will depend upon the same factors which affect its solubility, namely potassium, alcohol, pH, and tartrate of a wine.

Some malic acid is lost during fermentation of a wine. A decrease of 10-30% malic is observed during fermentation. This occurs through metabolism of the yeast according to the following metabolic pattern:



Malic Acid   Oxaloacetic Acid   Acetaldehyde   Ethanol

A loss of acid during fermentation can be shown by the previous discussion. However, wines from the Northeast are still higher than optimum and further reduction of the wine is necessary to market a palatable wine. Attempts to lower acidity involve using physical, biological, and chemical methods—either singularly or in combination.

A. PHYSICAL METHODS

1. *Amelioration with water to dilute acidity.*

BATF allows addition of water to reduce acidity, provided the acidity of the must exceeds 5 g/1,000 mL. If the acidity of the must does not exceed 5 g/1,000mL, no addition of water is allowed, except that sufficient water may be added to reduce the total soluble solids content to 22° Brix, regardless of the acid content.

Acid content shall be calculated before fermentation as tartaric in the grape juice. If the acid of the juice is in excess of 5 g /1,000 mL, addition of ameliorating materials is allowed in sufficient quantities to reduce the acid to not less than 5 g/ 1,000 mL. Provided that in no event shall the volume of such ameliorating material exceed 35% of the total volume of such ameliorated juice. (part 240, Title 26, Code of Federal Regulations, Section 240.960)

2. *Blending with low acid wines.*

This practice is employed to lower acidity by averaging the two acidities of the wines. Needless to say, the great majority of low acid wines are from warmer climates, which does not help wine sales in the Northeast. The amount of wine blended is dependent upon the labeling of the wine. No more than 25% of wine from a different geographical area may be used for blending to maintain geographical identities. They must be labeled as American wine (or just wine if less than 75% comes from a given geographic region).

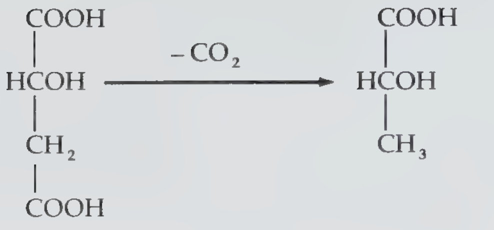
3. *Covering the acid taste with addition of sugar.*

Sugar addition will increase the °Brix/acid, or sugar/acid ratio, which in turn will mask the high acid taste of a wine.

B. BIOLOGICAL METHODS

1. *Malolactic fermentation.*

This procedure is a secondary fermentation in the wine caused by bacteriological action. The organism is *Leuconostoc oenos*, which will decarboxylate malic acid to lactic acid by the following mechanism:



$$\mathrm{COOH{-}HCOH{-}CH_2{-}COOH} \xrightarrow{-CO_2} \mathrm{COOH{-}HCOH{-}CH_3}$$

Malic Acid Lactic Acid

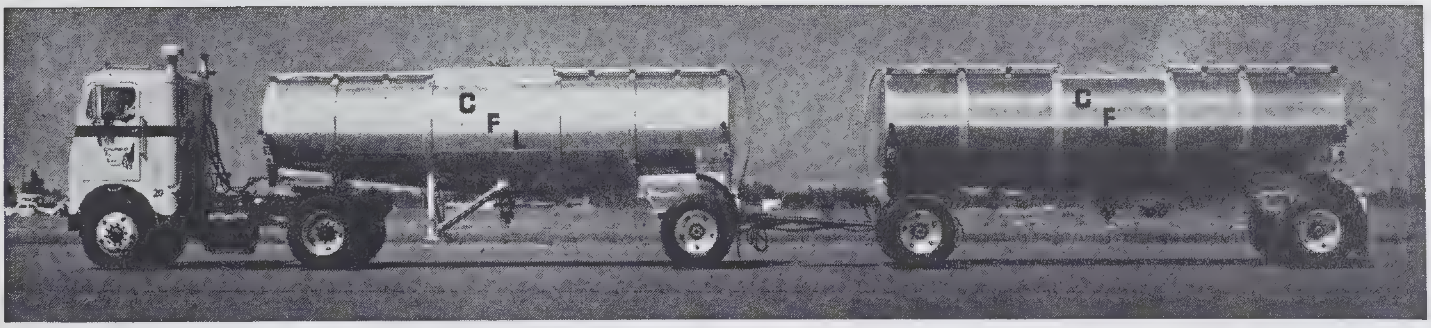
Removal of the acidic carboxyl group will result in a lower acidity. This organism and reaction has been studied since the discovery of fermentation by Pasteur. In the East, Robert Beelman at Penn State, James Gallander at Ohio State, and Andrew Rice at the Taylor Wine Company, have been leaders in study of the conditions of this reaction.

As expected, it is easier to induce this fermentation in wines which are produced from grapes grown in warmer climates compared to the Northeastern United States. Major reasons are lower pH's and temperatures of our wine cellars. As the pH or temperature of a wine decreases, the generation time of the organism increases. A lower pH or temperature does not mean that the organism will not grow and fermentation will not take place. It means that the onset of ML fermentation will be delayed, and when it does occur it will take longer to reach completion.

pH has an effect on the effectiveness of SO_2. Sulfur dioxide inhibits growth of *Leuconostoc oenos*, and since sulfurous acid behaves as any weakly-ionized acid, an equilibria similar to

CHEROKEE TANK LINES

SERVING THE WINE INDUSTRY OF CALIFORNIA



SPECIALISTS IN TRANSPORTATION OF WINE & WINE PRODUCTS EXCLUSIVELY

For a Quality Ride for your Quality Wines, call

CHEROKEE TANK LINES

5463 Cherokee Road, Stockton, California 95205; Phone (209) 931-3573

that of the malic and tartaric acids occurs in the wine. This equilibrium is pH dependent.

$$\underset{\text{Sulfur Dioxide}}{H_2O + SO_2} \longleftrightarrow \underset{\text{Sulfurous Acid}}{H_2SO_3} \xleftrightarrow{K_1} \underset{\text{Bisulfite Ion}}{HSO_3} \xleftrightarrow{K_2} \underset{\text{Sulfite Ion}}{SO_3^{=}}$$

When free SO_2 is measured, all forms of the sulfite are included. The effective bactericide is the H_2SO_3 portion of the equilibrium, and the pH will determine the amount of this component which will be present in the wine. Dr. Ralph Kunkee of U.C. Davis has predicted that bacteriological stability can be achieved with 30 ppm free SO_2 at 3.3 pH. At this pH, 4.8% of the free SO_2 is sulfurous acid or effective SO_2.

It is not uncommon for eastern wines to have a pH 3.0 or lower. At 3.0 pH, 9.1% free SO_2 would be sulfurous acid and 16 ppm free SO_2 would be required for the same bacteriological stability. This means that at northeastern pH values, only trace quantities of SO_2 can retard growth of the organism. Wines, whose pH average 3.5-3.6 would require at least 47-58 ppm to achieve the same stability. Calculation of the amount of free SO_2, pH, and active SO_2 can be seen in Table I.

Beelman has isolated a strain of *Leuconostoc oenos* from eastern wines. It is more tolerant to eastern conditions than the ML-34 strain. This strain has been named PSU-1. Beelman and his associates have worked up procedures for inoculation with this strain to induce ML fermentation. *(Available from Dr. Robert Beelman, Department of Food Science, Pennsylvania State University, University Park, PA 16802, or from Tri-Bio Laboratories, Inc.)*

Though this procedure has produced satisfactory results, the method is extremely empirical, and failure can result if directions are not followed and particular attention is not given to the pH and free SO_2 concentration.

2. *Fermentation with Shizosaccharomyces pombe.*

This yeast utilizes malic acid during fermentation:

$$\text{malic acid} \dashrightarrow \text{ethanol} + CO_2$$

The mechanism is probably the same as was described for loss of malic acid during fermentation. Considerable studies on this fermentation have been performed by H.Y. Yang at Washington State University and Gallander in Wooster, Ohio.

Fermentation eliminates malic acid; however, it has a large drawback of producing unnatural and undesirable flavors. Gallander has attempted to work around this shortcoming with a double fermentation. The must is fermented with *Sh. pombe* until malic acid has decreased to a pre-determined quantity. Fermentation is stopped by cooling the wine and allowing the yeast to settle. The wine is then filtered and re-inoculated with *Saccharomyces cerevisiae* to complete fermentation. Although this method reduces off-flavors, they are still present. It has not found favor as a commercial method because of off-flavors. However, with modern technology as it is today, criticisms of this method may be circumvented.

C. CHEMICAL METHODS

1. *Neutralization of acid with carbonates*

Chemical neutralization by addition of basic compounds has been employed in both Europe and the United States. In the Common Market countries of Europe, potassium bicarbonate, calcium carbonate and potassium tartrate are the only compounds allowed. United States Federal Regulations lists calcium carbonate, sodium carbonate, potassium carbonate, and potassium bicarbonate (a recent addition). The compounds are to be used for the purpose of reducing excess acidity in wines.

In the United States, all compounds listed are carbonates. This anion will react the same in all cases to stoichiometrically reduce acidity:

$$CO_3^{=} + H^+ \dashrightarrow HCO_3^- + H^+ \dashrightarrow H_2CO_3 \dashrightarrow H_2O + CO_2$$

The overall equation is:

$$CO_3^{=} + 2H^+ \dashrightarrow H_2O + CO_2$$

Neutralization of the acid yields carbon dioxide and water plus the cation. It is these cations which differentiate the mode of reaction and the effect of various carbonates. These cations in solution will also cause an increase in pH.

Fig. 4 shows the result of titrating a wine with 1M NaOH and 1M $KHCO_3$. A prominent feature of this titration is the long, linear rise in pH with the addition of base. Substitution of $KHCO_3$ for the strong base NaOH serves only to extend the linear portion of the line above pH 5.

The linear portion of the titration curve obtained with wine to be compared with those found for malic, tartaric, and hydrochloric acids are shown in Fig. 5. For these acids either individually or in equi-molar mixture, the buffering region is an upward slope, especially when compared with the strong acid. These dibasic acids, with slightly separated pK values do not give plateaus of constant pH, characteristic of simpler buffers. The reason is due to species overlap at each pH, as shown in Fig. 6 which is an expansion of Fig. 3.

The slope of the straight-line portion of the titration curve in Fig. 4 has been called the Buffer Coefficient. The inverse

KnighTec, Inc.

- Design, assembly & installation of motor control panels.
- Engineering & design done on premises.
- Supplies available • Programmable controllers

11410 OLD REDWOOD HWY.
WINDSOR, CA 95492
(707) 433-6931

Knights' Electric, Inc.

- Electrical installation & maintenance
- Commercial, industrial, agricultural
- 24 hr. emergency service

WINERIES, a specialty

P.O. BOX 928, HEALDSBURG, CA 95448 / (707) 433-6931

150 Wineries Now Use The Boswell Bung!

Can you afford to overlook this little gem? Fabricated from high grade silicone, the Boswell bung easily outperforms its fir and redwood ancestors. The Boswell bung puts a stop to wicking and requires no pretreatment.

Easy to place and remove, the Boswell bung provides extra protection for your valuable barrels. Best of all, the Boswell bung's virtually infinite lifespan ends the problem of periodic replacement. The Boswell bung. Cost efficient. Pure and simple.

For more information contact The Boswell Company
305 San Anselmo Ave. Ste. 313, San Anselmo, CA 94960
415 · 457-3955

THE BOSWELL COMPANY

of the Buffer Coefficient is called the Buffer Capacity because it specifies the amount of acid or base required to change the pH. Buffer Capacity can be calculated by recording the initial pH of 50 mL of a wine and the volume of 1M NaOH required to titrate the wine to a pH 5.0.:

$$\text{Buffer Capacity} = \frac{1000\ (\text{Equivalents of base used})}{\text{Vol. of wine titrated}\ (5.0\text{-Initial pH})}$$

The gradual rise of pH with added base places limits in the extent of de-acidification which can be accomplished through neutralization of acid in wines. pH must not be raised too high (3.6) in order to preserve color and microbiological stability. It does not matter whether a strong base, NaOH, or a weak base, $KHCO_3$, is used. However, the situation can be helped by removal of the malate or tartrate buffer, so that neutralization will be accompanied by a drop of pH toward that of the strong acid shown in Fig. 5. Consequently, chemical de-acidification may require both neutralization and precipitation of the buffer.

Sodium carbonate

Sodium carbonate is the simplest of carbonates in reduction of excess acidity. Its reaction is as follows:

$$Na_2CO_3 \dashrightarrow 2Na^+ + CO_3^{=} + 2H^+ \dashrightarrow 2Na^+ + H_2O + CO_2$$

Neutralization of acid by the carbonate is the only reaction which takes place. There is no removal of the buffer by precipitation, since the sodium salts of malate and tartrate are all soluble in wine. Reduction of 1.0 g/L acidity calculated as tartaric acid will require 0.71 g sodium carbonate/L. This substance has a disadvantage besides the large effect on pH. Reduction of 1.0 g/L acidity will result in the addition of 310 ppm sodium to a wine. The adverse publicity which sodium concentration in foods is receiving would make use of this chemical, even though approved, doubtful in a commercial operation.

Potassium bicarbonate and carbonate

Use of potassium bicarbonate and carbonate have recently been approved. Reaction of these compounds are similar, since the bicarbonate ion is an intermediate of the carbonate. The main advantage of the bicarbonate over the carbonate is that the bicarbonate is a weaker base and will not cause localized affects which may result from the carbonate. The basic reactions are:

$$K_2CO_3 \dashrightarrow K^+ + K^+ + CO_3^{=} + H^+ \dashrightarrow K^+ + \underset{\substack{\uparrow \\ KHCO_3}}{[K^+ + HCO_3^-]} + H^+ \dashrightarrow 2K^+ + H_2O + CO_2$$

Potassium salts differ from the sodium because of the secondary reaction which takes place. This reaction further reduces acidity as well as reducing the tartrate buffer:

$$K^+ + HTA^- \dashrightarrow KHTA$$

Without your label it's only wine

You make wine; we make labels.
Together we make a difference.

BLAKE PRINTERY

Call or write for a brochure
2222 Beebee Street • San Luis Obispo, California 93401
In California Call Toll Free 800-792-6946
Outside California 805-543-6843

MEL KNOX
Barrel Broker

Francois Frères of Burgundy
Tonnellerie Taransaud of Cognac

- New barrels of all sizes
- Tanks
- Used cooperage

1229 Third Avenue
San Francisco
California 94122

415-661-3413
415-661-1616

It is the above reaction which makes potassium salts more useful for de-acidification than sodium carbonate. A rule of thumb would be that if a wine were between 0.8-1.0% acidity, it could be lowered safely with use of potassium carbonate or bicarbonate. For each 1.0 g/L that the acidity must be lowered, use 0.62 g/L potassium carbonate or 0.9 g/L potassium bicarbonate. These amounts will neutralize some of the acid as well as precipitate some of the bitartrate. For this reason, a wine should be chilled to aid precipitation.

Calcium carbonate

Wines which have a high acidity and/or high pH cannot be de- acidified with potassium carbonate. These wines would usually be treated with calcium carbonate. This compound has been used throughout Europe and the United States as a means of de- acidification.

The common belief is that addition of calcium carbonate will result in precipitation of both malate and tartrate and this erroneous belief has caused problems in the industry. The carbonate will neutralize acids as in previous methods, but with calcium tartrate being less soluble in acid solutions than calcium malate, little, if any, calcium malate will precipitate until the majority of the tartrate has been deposited. The amount of calcium to complete this reaction is high; as a result, large concentrations of calcium will remain in solution. Further, calcium concentrations in excess of 150 ppm will impart a salty taste to a wine.

To overcome this problem, the Acidex or so-called double-salt technique is employed. It involves treating a predetermined portion of a wine or must rather than all the product as with potassium. The Acidex procedure is really the use of calcium carbonate in which you raise the concentration of calcium on a portion to remove the malate as well as the tartrate. (The product and instructions can be obtained from the U.S. distributor: Fenn Valley Vineyards, R.R. 1, 122nd Avenue, Fennville, MI 49408.)

When using this Acidex procedure, the description double-salt may be a bit surprising. This would imply that the drop in tartrate would be equal to a drop in malate. However, it is noticed that the drop in tartrate is greater than the malate.

Calcium tartrate is more difficult to remedy than potassium bitartrate since it is difficult to predict. Calcium tartrate crystals grow at a slower rate than potassium bitartrate. This will create problems because cold stability tests used in most wineries are of short duration and do not predict potential calcium stability which may occur several months after wine is bottled. Cold storage of a wine is required for a minimum of five weeks. It is then filtered at that cold temperature.

Another method proposed by Martini (Martini, M., Rev. Viticolt. Enol. (1965) **18** 379-86) takes advantage of the solubilities of the various forms of calcium tartrate. Following are the solubilities of these compounds:

D-calcium tartrate = 230 mg/L
L-calcium tartrate = 250 mg/L
Racemic calcium tartrate = 30 mg/L

Auto-racemization of dextro-rotary tartrate in wines is quite slow and requires elevated temperatures for prolonged periods. It is not good practice in winemaking except for the production of Sherry. Martini proposed addition of racemic tartaric acid prior to refrigeration to remove excess calcium from wine.

2. *Ion Exchange*

The ion exchange method consists of a two column system: a strong cation column (Duolite C-25D) in the H form, and a weak anion column (Duolite A-7D) in the free base form. The free amine is the reaction site in the anion column which removes the acid in total, and not an exchange of OH^-. Therefore, a portion of the wine equal to the amount the acidity is to be decreased is first subjected to the cation column to exchange the cations for H^+. This is necessary since the weak anion exchange has poor salt splitting capacity. Fig. 7 gives a schematic of the procedure.

Addition of an ion-exchanged wine (initial total acid content 1.02%) in amounts from 0-40% back into the untreated wine results in a progressive linear decrease in total acidity, malic and tartaric acids as shown in Fig. 8. The decrease in potassium and sodium as well as the effect on the Concentration Product can be seen in Fig. 9. A white wine with an acidity of 1.24 to be reduced to 0.7 would require 44% of the wine be treated

WINE PUMPS

- VARIABLE OR SINGLE SPEED
- POSITIVE DISPLACEMENT
- CENTRIFUGALS
- AIR DIAPHRAGM
- PARTS & SERVICE

Also offering:

STAINLESS FITTINGS
ELECTRICAL MOTORS
INDUSTRIAL SUPPLIES
POWER TRANSMISSION EQUIPMENT

Variable speed positive displacement Jabsco pump

BURKHART
INDUSTRIAL SALES

(707) 433-3265

3654 W. DRY CREEK RD. HEALDSBURG, CA 95448

VINTNER CONSULTING

Vine Chemistry Management
Pest Control Strategies
Vineyard Evaluation
Trouble Shooting

RICHARD NAGAOKA
1620 Scott St.
St. Helena, CA 94574
(707) 963-1113

(1.24 - 0.7/ 1.24). Analysis of this wine before and after the ion exchange treatment can be observed below:

	pH	Total Acidity (%) Observed	Total Acidity (%) Calculated	Tartrate g/100mL	Potassium (ppm)	Sodium (ppm)	CP (x10^{-5})
Original wine	2.85	1.24	----	0.30	590	37	12.1
Treated	2.84	0.71	0.70	0.17	340	20	3.9

An important point to be noted is that although the acidity was reduced, the pH remained unchanged.

D. NEWER COMBINATION METHODS

1. *Simultaneous method for pH and acidity adjustment.*

The ion exchange procedure coupled with use of $KHCO_3$ can be employed simultaneously to adjust acidity and pH of wines to pre- determined values. The ion exchange procedure is used to de- acidify a calculated portion of a wine while the $KHCO_3$ treatment is used primarily to adjust pH. Calculations employed take into consideration the buffer capacity of a wine and the stoichiometry of acid-base neutralization phenomena. Acidity may be reduced 50% without adversely affecting wine. Table II shows calculations involved in this process and data on an example which was put through this method.

2. *Sequential method of acid adjustment using $CaCO_3$ and $KHCO_3$.*

As previously mentioned, $KHCO_3$ cannot be used on wines with an acid over 1.0%. $CaCO_3$ or Acidex would be used in this case. However, the treacherous nature of $CaCO_3$ has caused many a good winemaker his job. Precipitation of crystals occur after considerable time, thus the wine is already bottled. It is best to adjust the must using the Acidex procedure, then the product will have considerable time before being bottled and the calcium concentration will be reduced to a safe level. However, the adjustment to an exact acidity is rather difficult using this method.

A method has been developed which will require that acidity of the must be adjusted to approximately 1.0% prior to fermentation. Following fermentation, acidity of the wine should be between 0.75 - 0.8%. Final adjustment is made before bottling with $KHCO_3$ which will allow an exact adjustment of acidity of a high acid wine with a minimum effect on pH. Fig. 10 gives a schematic display of the procedure, and Table III shows the analysis of wines which were treated in this manner.

Through research and industrial cooperation, we are now able to control the acidity problem in the Northeast. The only way the Northeast can evolve as a great wine area is by producing a product which is not overpowering in acid taste, and which has a unique appeal to the public. Using French and American hybrids, this can now be accomplished.

(Presented at the Viticultural and Enology Seminar at the University of Connecticut, Storrs CT. Jan. 20, 1984.)

All figures and tables on pp. 36-38

PRODUCTION AND PROCESSING MACHINERY AND EQUIPMENT FOR THE WINE INDUSTRY

THE COMPLEAT WINEMAKER

1219 MAIN STREET
ST. HELENA, CA 94574
707-963-9681
TWX 510-746-6176

RAMONDIN, U.S.A.
manufacturers of bottle capsules

established 1890

quality
tradition
excellence
elegance
prestige

we specialize in capsules

stock capsules shipped
immediately from our
Burlingame warehouse

RAMONDIN USA • 1041 Edwards Road • Burlingame, CA 94010
415-340-7225 • Telex 296117 RAMD UR

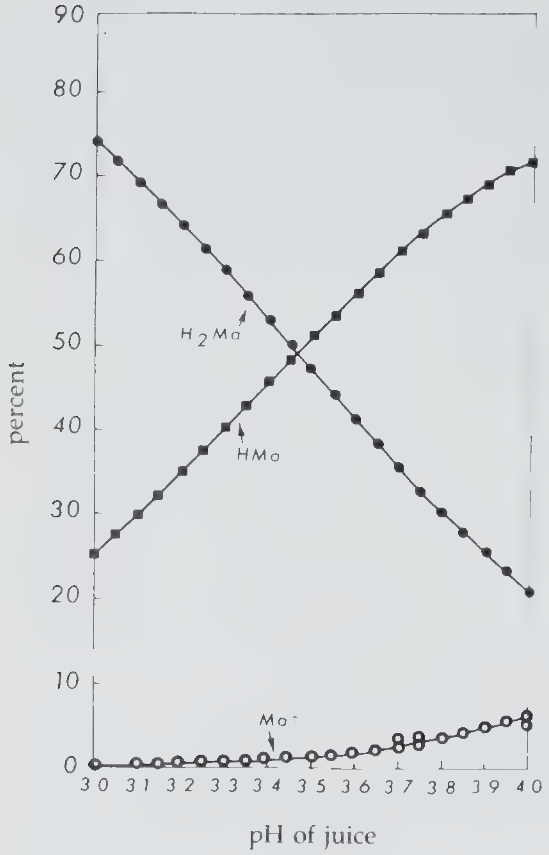


Figure 1

Malate: Effect of pH on Percentage of Acid, Acid Salt and Salt in Must

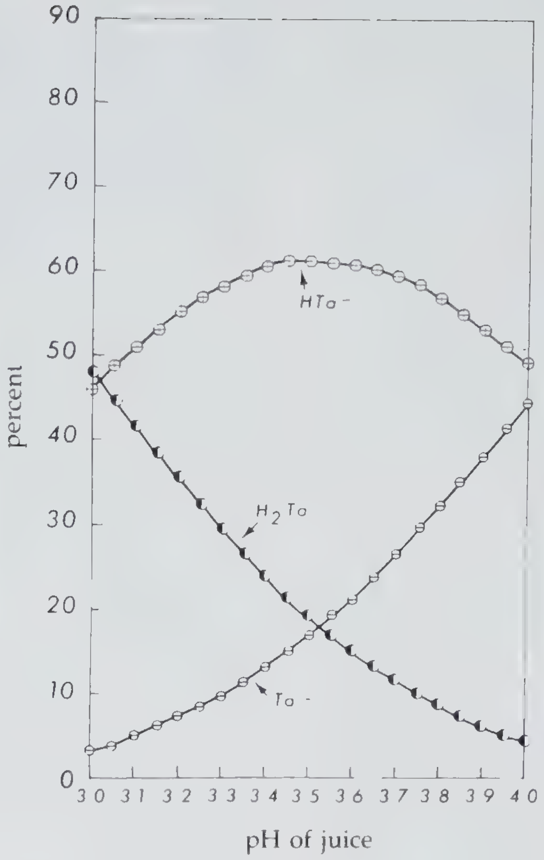


Figure 2

Tartrate: Effect of pH on Percentage of Acid, Acid Salt and Salt in Must

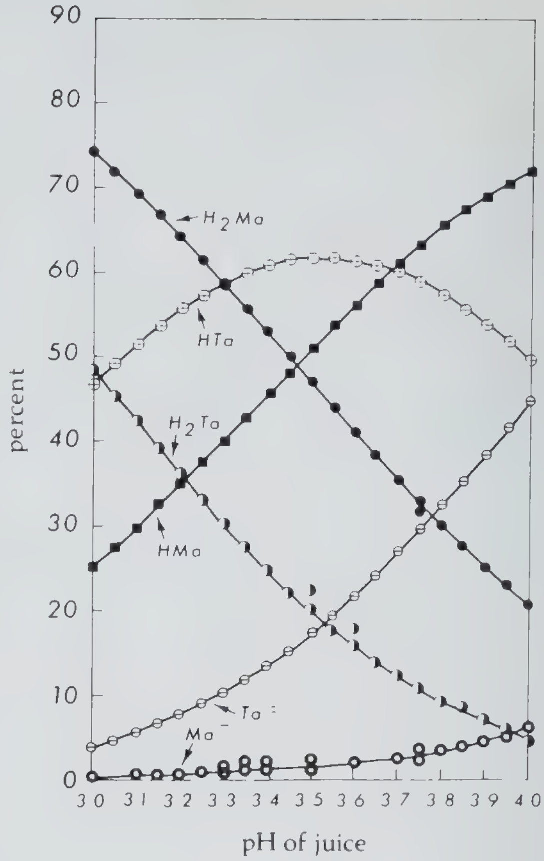


Figure 3

Malate and Tartrate: Effect of pH on Percentage of Acid, Acid Salt, and Salt in Must

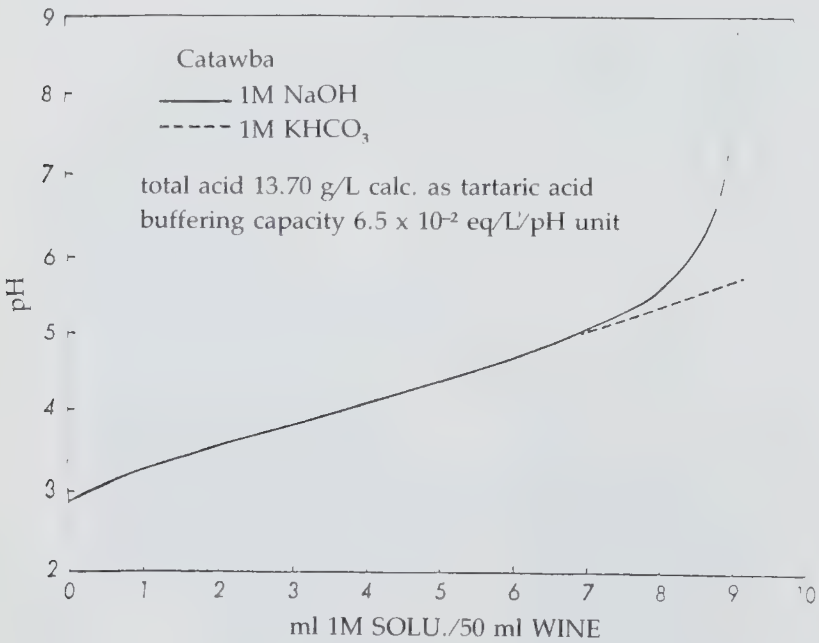


Figure 4

Titration of a Wine with a Strong Base (NaOH) and a Weak Base ($KHCO_3$)

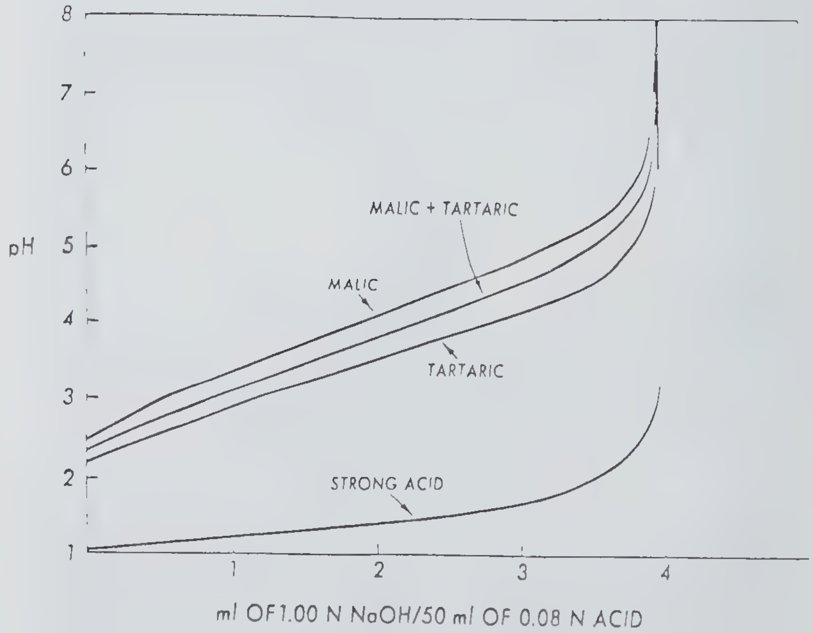


Figure 5

Titration of Pure Acids
(equal concentration of each)

"I read it in
PRACTICAL WINERY!"

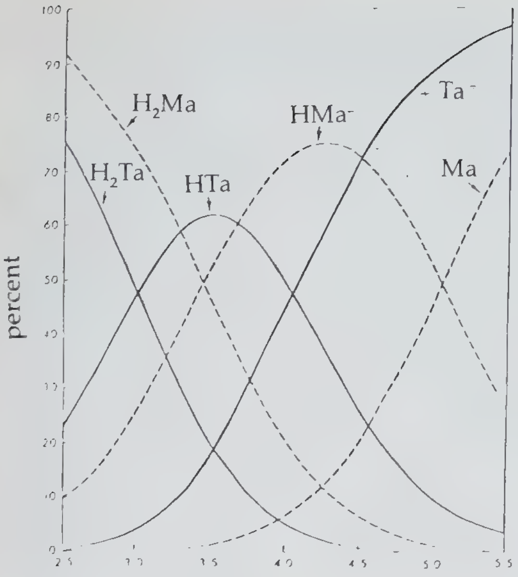


Figure 6

Relative Concentrations of Tartrate and Malate Ionic Species in Water at Various pH Values

High acid wine determined by titration

Determine the acidity desired
Calculate the amount to be ion exchanged

$$\text{Fraction to be exchanged} = \frac{\text{Initial acidity} - \text{Desired acidity}}{\text{Initial acidity}}$$

Pass the calculated volume through the cation column (Duolite C-25D)

Pass eluant from cation column through anion column (Duolite A-7D Free Base Form)

Blend exchanged fraction with non exchanged fraction

Figure 7

ACID REDUCTION WITH ION EXCHANGE

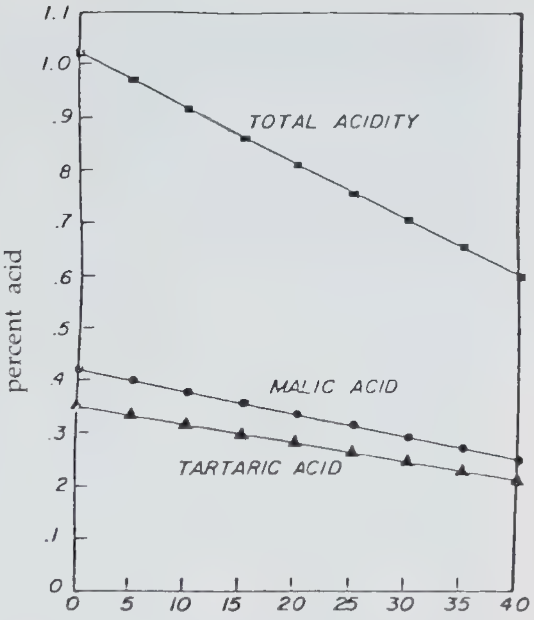


Figure 8

Effect of the Addition of Cation and Anion Exchanged Wines on the Total Acidity and Malic and Tartaric Acids

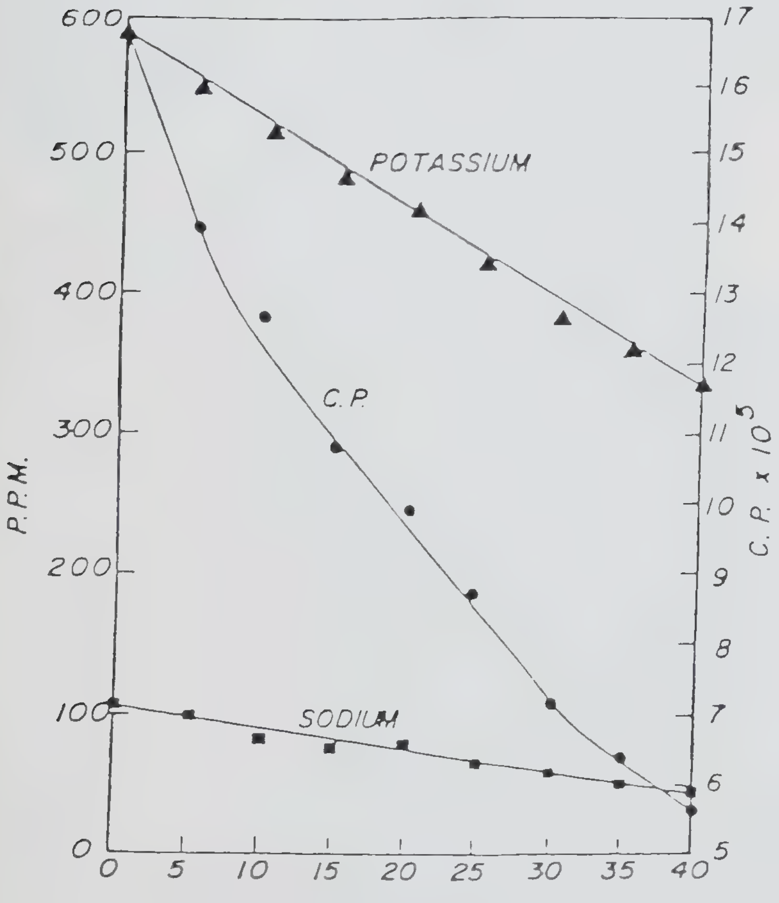


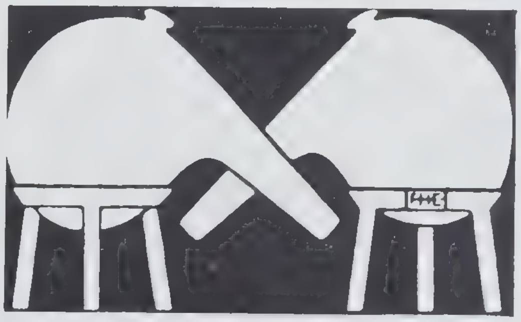
Figure 9

Effect of the Addition of Cation and Anion Exchanged Wines on the Sodium and Potassium Concentration and the Concentration Product

1. Determine the acidity of the must prior to fermentation.
2. Using the Acidex Procedure adjust the must to an acidity between 1.0 and 1.10%.
3. Following fermentation and just before bottling, final adjustment of acidity with $KHCO_3$.

Figure 10

Schematic of the Sequential Process Using $CaCO_3$ and $KHCO_3$



Each time you reference PW,
our foundation becomes stronger.

TABLE I

Effect of pH and Free SO_2 on Microbiological Stability (Mattick, L.R. Unpublished Data. 1974)

pH	% SO_2	ppm Free SO_2 Needed bases on 30 ppm at pH 3.3
2.8	13.7	10
2.9	11.1	13
3.0	9.1	16
3.1	7.4	19
3.2	5.9	24
3.3	4.8	30
3.4	3.8	37
3.5	3.1	47
3.6	2.5	58
3.7	2.0	73
3.8	1.6	92
3.9	1.2	115
4.0	1.0	144
4.1	0.8	182

At pH 3.3 and 30 ppm Free SO_2 (analyzed) = 1.43 ppm H_2SO_3
At pH 3.5 and 30 ppm Free SO_2 (analyzed) = 0.918 ppm H_2SO_3
At pH 3.5 and 47 ppm Free SO_2 (analyzed) = 1.43 ppm H_2SO_3

Therefore, at pH 3.3 and 30 ppm, we would have the same conc. of H_2SO_3 that we would have at pH 3.5 and 47 ppm free SO_2.

TABLE III

Analysis of Musts Sequentially Treated with $CaCO_3$ and $KHCO_3$

	Original Untreated Juice			Treated Portion		
	TA	pH	Ca (PPM)	TA	pH	Ca (PPM)
CP Concord	1.21	3.21	130	0.35	4.31	1040
Catawba	1.26	3.11	95	0.44	4.21	1230

	Final Juice Blend			Wine (Post Fermentation)		
	TA	pH	Ca (PPM)	TA	pH	Ca (PPM)
CP Concord	0.97	3.43	536	0.82	3.20	142
Catawba	0.98	3.36	595	0.76	3.22	158

Wine after Treatment with $KHCO_3$

	TA	TA (CALC.)	pH	Ca (PPM)
CP Concord	0.70	0.70	3.30	135
Catawba	0.65	0.65	3.32	144

TABLE II

Calculations of Simultaneous Adjustment of pH and Acidity to Predetermined Values with an Example

1. Information to be determined.
   a. Initial pH
   b. mL 1 M NaOH to titrate 50 mL wine to pH 5.0
   c. Total acidity in g/L tartaric acid

2. Finished product
   a. Desired pH
   b. Desired total acidity in g/L tartaric acid

3. g $KHCO_3$/L required to raise the pH to desired level (A)

$$\frac{10^2 \text{ X } ml_{base} \text{ X } N_{base} \text{ X (desired pH} - \text{Initial pH}}{\text{Volume wine titrated X } (5.0 - \text{Initial pH})}$$

4. Acidity of the wine (g/L) after addition of $KHCO_3$ (B)
   Initial acidity (g/L) –0.75 (A)

5. Fraction to be ion exchanged (C)

$$\frac{\text{B} - \text{desired acidity (g/L)}}{\text{B}}$$

6. g $KHCO_3$ to be added to the unexchanged wine
   A (1 – C)

7. Example — Variety Seyval Blanc

Determined	Desired
Initial pH = 2.96	pH 3.30
Initial Total Acidity = 12.6 g/L	Total Acid = 7.0 gL
mL 1 M NaOH for 50 mL wine to pH 5.0 = 6.16 mL	

8. Summary of example

	1 liter of wine	100 gal. wine (378.54 L)
Volume exchanged	367 mL	36.7 glas.
Volume unexchanged	633 mL	63.3 gals.
Amount of $KHCO_3$ added	1.30 g	1.08 # or 492.1 g

9. Analysis

	Initial	Adjusted	
		Immediately	1 month at 30°F
pH	2.96	3.32	3.31
Total acidity g/L	12.6	7.2	7.1

Service for Two!

We Have Quality Bottles; We Have Availability.
Let Us Serve You.

Calpac Container Co.
Representatives for Madera Glass and Northwestern Glass
33359 Central Avenue, Union City, CA 94587, (415) 471-5091

Sterile Filtration with Filter Sheets

H. Tesch, Managing Director, E. Begerow Co.

For decades, sheet filtration has been the classical procedure for fine clarfication of wine, and the most effective method, too. Particularly the sterile filtration, i.e. safe and complete removal of the finest particles and microorganisms, is of special importance for vinification. The traditional filter sheet, in use for years, contained asbestos.

In the last ten years there has been an increasing tendency in many countries to reject and eliminate asbestos for protection of the environment and human health. Consequently, filter sheet manufacturers had to develop an alternative in the form of asbestos-free filter sheets for sterile filtration.

Filter Sheets and Depth Filtration

Between 1915 and 1920, Dr. Schmidthenner discovered that adequately refined chrysotile-asbestos may effectively be used for sterile filtration. Since then, and increasingly since 1950, finely refined asbestos in portions of 30-55% has been used in filter sheets for sterile filtration.

Besides that, these filter sheets contain various grades of cellulose and sometimes small amounts of fine kieselguhr. To improve the wet strength of the filter sheet, completely aged cationic synthetic resins are either added to the pulp or applied onto the sheet outlet side to prevent particle migration. The resulting fibre matrix is approximately 3.5-4 mm thick. As retention of turbidities and microorganisms mainly take place inside the filter sheet, sheet filtraion is also called 'depth filtration' in contrast to 'surface filtration' with membranes.

Depending on manufacturing process and sheet type, asbestos-free filter sheets are made of granular inorganic raw materials such as kieselguhr, perlite, etc. In addition, they contain 40-60% fibrous materials, mainly ultra-refined celluloses. After homogenous suspension in water, these two materials form the basis of the sheet matrix.

To improve the mechanical stability, cationic synthetic resins are added to the pulp. These resins also have positive influence on the surface activities of kieselguhrs and cellulose; however, the kinetic potential (Zeta-Potential) has not reached that of asbestos so far. This is why the manufacturing process —sheet formation on Fourdrinier-wire—requires a much more specific know-how to obtain a pore structure which is suitable for safe sterile filtration, than ever required for asbestos-containing sheets.

Asbestos-free depth filter sheets for sterile filtration are characterized by a pore structure which narrows in filtrate flow direction. This pore structure is achieved by taking advantage of physical laws during sheet formation. Depending on the product, about 70-82% of the sheet matrix of an asbestos-free sterile sheet is utilizable as pore volume for filtration.

Asbestos-free filter sheets for sterile filtration are used in plate filters, normally called 'sheet filters'. After the filter has been packed with filter sheets, it is sterilized with saturated steam of 115°C (239°F) (preferred) or hot water at 180°F for a period of 30 minutes.

All filter parts coming in contact with liquids must be free of deposits and have to be subjected to the sterilizing procedure for at least 30 minutes. After sterilization, the filter is flushed with cold potable water until water comes out clear and free of taste and odor. During this flushing process the filter system cools down. A pressure test should prove that the filter is adequately sealed. After sterilization, reinfections must be absolutely prevented.

Sterile filtration of table wine and sparkling wine is normally done with flow rates of 350 to 450 l/m²/h. Filter outlet pressure

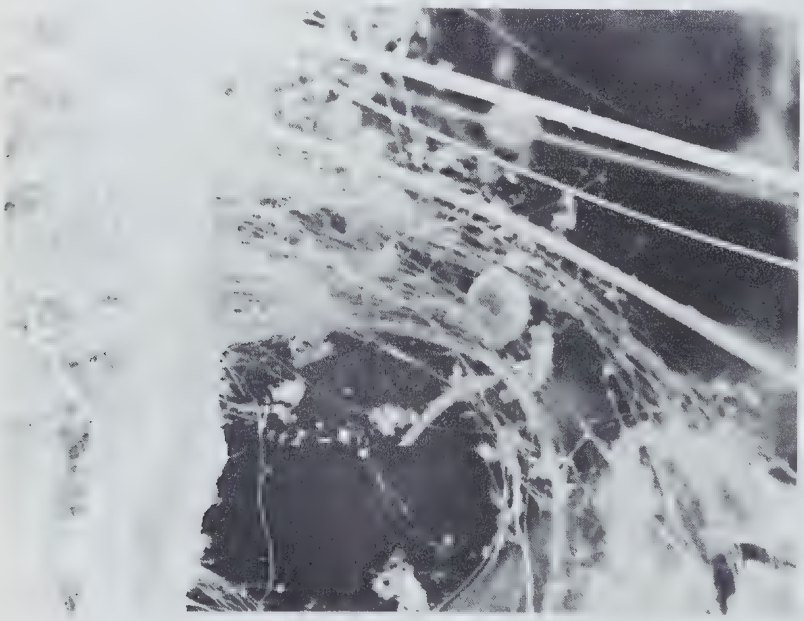


Figure 1. Makro-photo of an asbestos sterilizing sheet after wine filtration. Material and pore structure are clearly visible as well as the process of retaining and removing turbidities and living yeast cells.

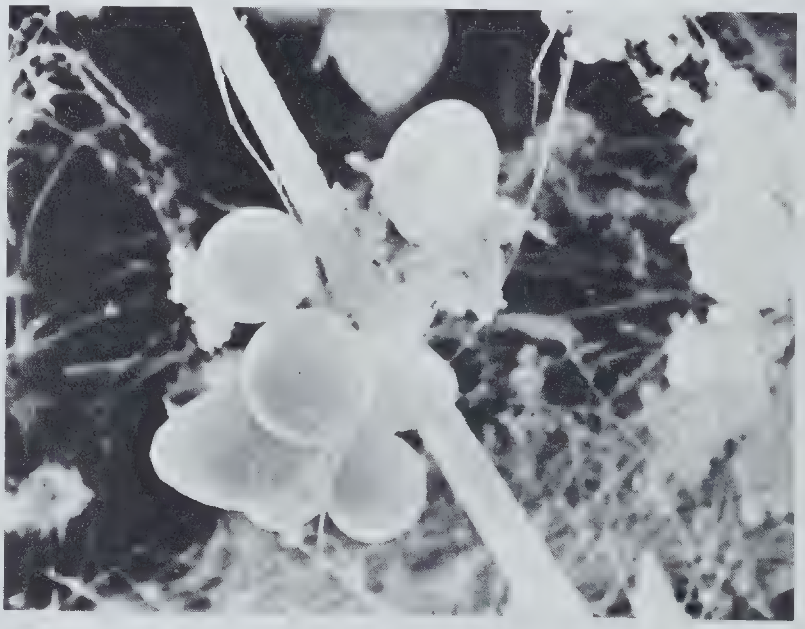


Figure 2. Yeasts and particles retained by an asbestos fibre because of its positive surface potential.

of wines containing CO_2 should exceed saturating pressure of the beverage by at least 1.5 bar. Filtration can be carried out until a differential pressure of 1.5 bar is reached. During filtration this is important to ensure an even liquid flow through the filtration plant.

As previously mentioned, flow intensifies adsorption. If the flow movement is interrupted or reduced, adsorptive forces are more or less reduced as well. The consequence is that particles which have been removed by adsorption before might be released, while particles still suspended in the liquid are not retained and may be washed out. This is best prevented by the installation of adequate diversion valves which ensure an equal and continuous liquid flow through the filter, even in cases of interrupted filtrate outlet (*e.g.* filler stop) by feeding the liquid back to the filter inlet.

Depth filter sheets can be regenerated in the filter, which means that particles are rinsed out of the sheet by flushing the filter with cold water first, then with warm water of 45-55°C (113-131°F). Rinsing is done against flow direction and at a flow rate which exceeds that of filtration by 25%.

If need be, water must be treated, *i.e.* high degrees of hardness and/or high mineral contents have to be reduced, in order to avoid crystal formation. Water up to 10° German hardness is ideal for this purpose. After regeneration, another sterilization is required, which, however, is not done with steam but with hot water and in flow direction of the filtrate.

Depending on germ content of the unfiltered product and conditions in the individual winery, this procedure will allow to extend filter service life to several days, sometimes even to some weeks. Because of the energy and time required and because of the risk that sheets are damaged by steam shocks, we do not recommend repeated steam sterilization.

Turbidities and Microorganisms to be Removed

Ordinarily, wineries are self-contained biochemical and microbiological systems whereby one winery differs considerably from the other. Even within one winery there may be more or less important differences in products, depending on vintage, grape types, etc. Besides that, individual procedures for grape processing, fermentation, primary clarification, fining and stabilization, polishing/high polishing, etc. will lead to a variety of pre-conditions for wine preparation.

Operating methods in small, medium and large wineries as well as the enological philosophy of a winemaker further influence the contents of microorganisms, colloidal matters and turbidities in wine and, thus, create distinct pre-conditions for sterile filtrations. This is to emphasize that for sterilizing filtration there is no general and ideal pattern which applies to all wineries.

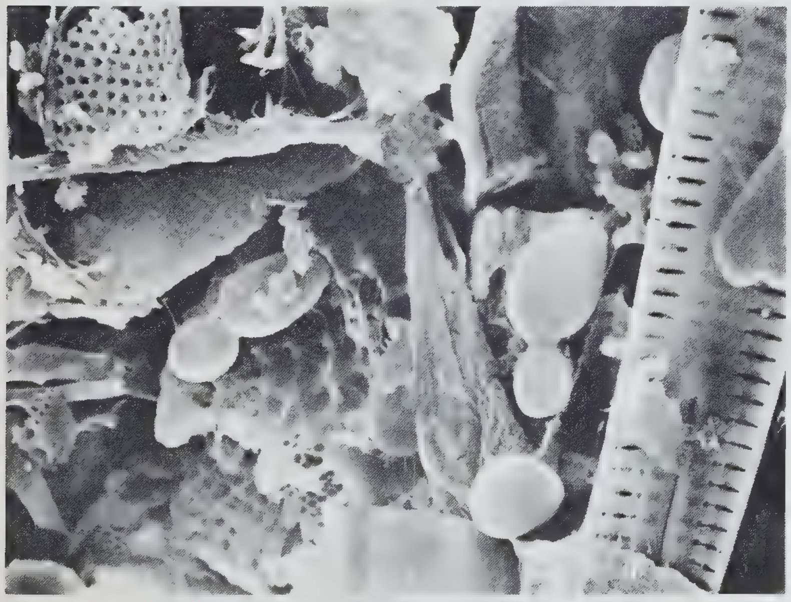


Figure 3. (in comparison with Fig. 1 and 2) Inside an asbestos-free sterilizing filter sheet. The smaller pore structure is clearly visible.

Nowadays, most wines coming to sterile filtration have been adequately prepared before by fining, chemical stabilization and polishing filtration. Particles still to be removed after this pre-treatment can be divided into two groups:

Colloidal Matters & Fine Turbidities

This group is very complex and often a very stable system of various macromolecular and colloidal matters:

- protein/tannin complexes
- polysaccharides
- protein-heavy metal complexes
- microcrystals
- crystal/tannin/phenol complexes
  etc.

In this group a balanced electrokinetic system is formed by the combination of particles with opposite charges. The expression 'protective colloid' for microorganisms and microcrystals is well-known.

Microorganisms

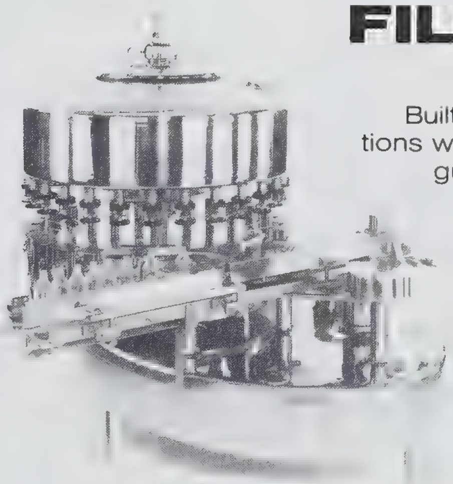
Due to the pre-conditions mentioned above, the microflora of wine includes a great variety of organisms:

- Genuine and wild yeasts, Kahm-yeasts, etc. (size: approx. 3-10*u*)
- Lactic and acetic acid bacteria as well as other rod-shaped bacteria (size: approx. 0.4-1*u*)
- Now and then slime-forming bacteria, cocci etc. (size: approx. 0.3-0.8*u*)

Microorganisms may occur sporadically or in large quantities, enveloped by protecting colloids or in form of large cell complexes. Inside the sterile filter sheet these complex systems are separated from the wine. Sterile filtration is accomplished by the porosity, the hydrophilic reactions and the electrokinetic potential of the filter sheet on the one hand, and by the wine with its special characteristics, such as pH-value, alcohol and sugar content (viscosity) and turbidities on the other hand:

—Directly filterable particles, such as microorganisms, crystals, large colloids etc. are removed mechanically (screen filtration) as well as by energy absorbance by diversion of filtrate flow and consequent adsorption of particles from the filtrate.

SANITARY FILLERS



Built to your specifications with a new machine guarantee, these all stainless steel sanitary gravity liquid fillers come in 6 to 32 valve sizes with speeds from 12 CPM to 250 CPM. Screw and snap cappers available.

TELEPHONE (616) 392-1808
FOGG FILLER COMPANY
FILLERS · CAPPERS · VALVES · PARTS
37 VAN DYKE STREET, HOLLAND, MICHIGAN 49423
TELEX 226357

—With colloidal substances, protecting colloids etc., the positive and negative electro-kinetic surface activities inside the filter sheet will affect the balance of electro-kinetic particle charges. Consequently, colloids agglomerate and fractionate and, thus, can be removed by mechanical and adsorptive filtration.

Considering the above facts, it is conceivable that filter sheet manufacturers offer and produce several types of sterilizing filter sheets with different porosities. The sheet type suitable for the individual winery must be determined on the basis of the existing conditions and the contents of turbidities, colloidal matters and microorganisms of the wine to be sterilized.

In my opinion, every winery should check from time-to-time the filterability of their wines and the performance of their filtration plants. Such a check is particularly necessary if working procedures have been changed, *e.g.*:

- Change from manual picking to machine-picking
- Changes in grape treatment
- Adoption of must pasteurization
- Change from spontaneous fermentation to fermentation with cultured yeasts
- Fining modifications
- Modifications in pre-filtration, *e.g.* change from sheet filtration to kieselguhr filtration or from kieselguhr filtration to clarification by separator.

In the field of rough and fine filtration this control can be done by means of photoelectric turbidity meters (Tyndall-effect). For colloid removal and sterile filtration a test method called 'indice de colmatage' has proven to be good, however, for this method exact temperature control and selection of regularly formed membrane disks is very important in order to obtain reproducable results. Some large wineries check the filterability of their wines and the performance of their filters by means of costly particle counters.

Particularly in cases where membrane filters are installed downstream of the sterile sheet filter, a very fine filtration with tight filter sheets is recommended to remove colloids and turbidities and allow extended service lives of the expensive membrane filters.

Performance of Asbestos-Free Filter Sheets

Sterile filtration with asbestos depth filter sheets has been an approved system for more than 50 years. However, there is also a 10-year record of excellent performance for asbestos-free sterile filtration. During these 10 years, asbestos-free sterile filter sheets have established all over the world a splendid reputation of reliability and efficiency for final filtration in the wine trade. However, it ought to be emphasized that with asbestos-free filter sheets adherence to the standard filtration rules is of particular importance, because of the different grade structure of asbestos-free filter sheets:

-Prior to the actual final sterile filtration, turbidities and microorganisms should be reduced to a rate of max. 300-500 germs/ml.

-All parts of the filter used must be suitable for sterilization with steam or hot water in order to avoid reinfections. Filter plates must not damage the filter sheets.

-Filter sheets used must be without damage and have to be inserted in correct sequence.

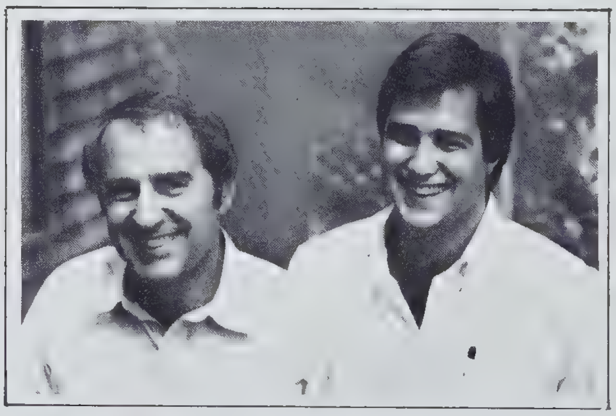
-Rubber washers installed must be of correct size and quality so that the filter is tightly sealed during operation. Furthermore, all moving parts of the filter should be properly serviced to provide maximum closing pressure. Due to their special composition, the structure of asbestos-free filter sheets is more

WE ARE KNOWN BY THE
CUSTOMERS WE KEEP.
LET *ERICKSON*
CARRY THE LOAD FOR *YOU*.

SPECIALIZED BULK CARRIER OF
WINE PRODUCTS, ALCOHOLIC LIQUORS, ALCOHOL,
FRUIT JUICE AND FRUIT JUICE CONCENTRATES

ET
ERICKSON TRANSPORT

(800) 641-4595



Joseph W. Ciatti John Ciatti

WINE BROKERS
JOSEPH W. CIATTI CO., INC.

STANDARD & VARIETAL WINES IN BULK
BRANDY • CONCENTRATE

42 Miller Avenue, Mill Valley, CA 94941
Phone (415) 388-8301

solid than that of asbestos sheets which makes them less compressible. Besides that, an increased capillar absorption is typical for asbestos-free filter sheets, because of their high kieselguhr content.

-Sterilization with saturated steam of 115°C (239°F) or hot water of 85-95°C (185-203°F) must comprise the complete filtration system and should be carried out for 30 minutes.

-The system should be flushed with potable water until the water comes out clear and free of taste and odor. In some cases it will be recommended to rinse the filter by circulating 0.5-2% citric acid to remove undesired minerals originating from the raw materials used.

-Flow rate should be in the range of 350-450 l/m²/h, the exact rate depends on turbidity and germ content of the liquid to be filtered.

-The filtration system must always be de-aerated carefully.

-Exit pressure of liquid must exceed its CO_2-saturation pressure by at least 1.5 bar. In any case, exit pressure should be at least 0.5-1 bar.

-Pressure shocks have to be avoided and should never exceed 0.7 bar.

-All interuptions and re-starts of filtration may be detrimental. Therefore, they should be avoided by installing suitable overflow valves. A short liquid circulation is necessary after every working break.

-Differential pressure (▲p) between inlet and outlet must not exceed 1.5 bar. In cases of high colloid contents or high pH-values, a pressure of 1.0 bar should not be exceeded.

-Regeneration with cold water and, subsequently, with warm water of 45-55°C should be carried out in filtrate flow direction and at a flow rate which is 25% higher than that of filtration. Afterwards, sterilization must be repeated.

-Avoid reinfections!

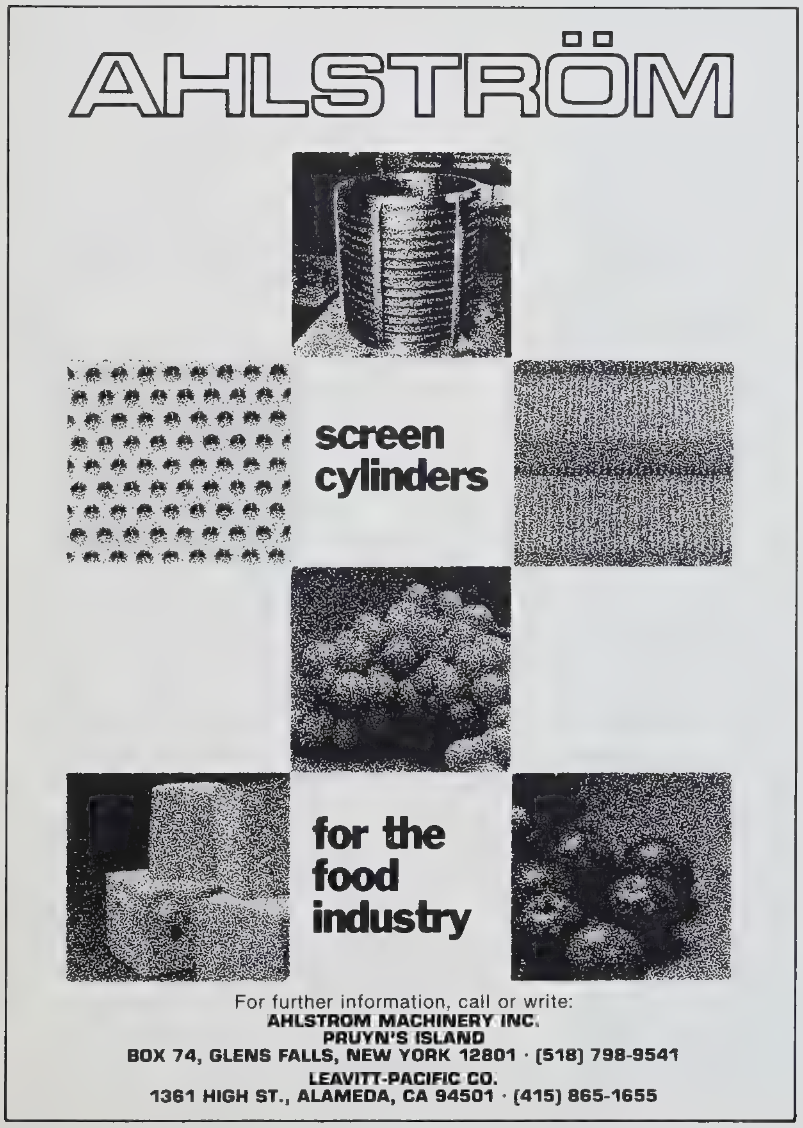
In the last 10 years we have been able to observe the effective performance of asbestos-free depth filter sheets in the sterile filtration of wine in many wineries all over the world. The sheets have in all cases proven microbiologically safe and efficient. Re-infections downstream of the sterile filter create very often problems of some complexity which can be eliminated by an over-all and continuous quality control only. Membrane filters for removal of eventual re-infection should, therefore, be located as near as possible to the filler.

Only a few details of filtration are predictable, because of scientifically proven theoretical data. As a matter of fact, the actual filtration pattern in a winery should be established on the basis of close observation, complete recordings and proper evaluation of the conditions that prevail in the winery.

As final remarks, I wish to draw your attention to some facts which were established during the use of asbestos-free filter sheets:

-Liquid and color adsorption of asbestos-free sheets is considerably lower. Wineries with frequent product changes, *e.g.* from red to white and vice-versa, will definitely take advantage particularly of the low color adsorption. After water-rinsing in flow direction, one may change from red to white without the risk of color deviations, and continue with sterile filtration until saturation of the sheets.

-In a leading winery, the asbestos-free sterile sheets are daily regenerated with water. This is done by backwashing with cold water, velocity of which 1.25 X wine flow-rate, followed by warm water of 45-55°C (113-131°F). Water flow


AHLSTRÖM

For further information, call or write:
AHLSTROM MACHINERY INC.
PRUYN'S ISLAND
BOX 74, GLENS FALLS, NEW YORK 12801 · (518) 798-9541
LEAVITT-PACIFIC CO.
1361 HIGH ST., ALAMEDA, CA 94501 · (415) 865-1655

HOT AIR
to 600° C.
BLOWERS AND
HEAT SOURCES

Clean, safe, reliable for continuous industrial use.
110 Volt, 220 Volt or 440 Volt up to 10,000 Watts
Heat, shrink, bend, solder, de-solder, weld thermoplastics, activate adhesives, distill, dry, sterilize.

Adjustable Temperatures to 600° C.
WELD PLASTICS
PVC pipe, repair cracks, make your own fittings, repair storage tanks, pond liners, bale covers, tarps, conveyer belts, feed bins, vehicle parts, weld, shrink, heat, dry, sterilize

CALL OR WRITE FOR BROCHURE NO. 20 38PW
brian r. white co., inc.

313 henry station road
ukiah, ca 95482-9990
(707) 462-9795

one industrial way w., bldg. e.
eatontown, nj 07724-9998
(201) 544-1212

will be reversed (back to normal flow direction) after it emerges clear. Water is then heated up to 90°C (194°F) and circulated for up to 30 minutes *in* flow direction to re-sterilize the filter. Application of this regeneration process has extended sheet life to 1-3 weeks with full biological stability. Filtration results are constantly checked with by-pass membrane filtration. This system has been applied since 1978.

-Already in 1977, asbestos-free sterile filter sheets demonstrated quite remarkable results vs. asbestos sheets when a major European winery conducted the following test:

Sheet filter 60 X 60 cm
50 plates (about 16 m² filtering area)
Average flow rate of 15,000 l/h 940 l/m²/h
Total throughput: asbestos-free 45,000 l;
asbestos-containing 22,000 l

Asbestos-free sheets reached more than twice the service life of asbestos sheets with absolute sterility. Since 1980, this winery has been using exclusively asbestos-free sterile sheets and cut its sheet consumption in half.

-A north European state wine monopoly conducted in 1981-82, for almost 12 months, a large-scale survey of the performance of asbestos-free filtration with the aim to establish exact comparison data for a change from asbestos to asbestos-free filtration. It was established that, under identical conditions, asbestos-free sterilizing sheets ranked first in biological stability, colloid removal and sheet life.

Sheet filter of 60 X 60 cm
100 plates (about 32 m² filtering area)
Average flow rate of 15,000 l/h 470 l/m²/h
Total throughput: asbestos-free 140,000 l;
asbestos-containing 100,000 l

Absolute particle removal in the range from 0.45-1.2*u*:
asbestos-free 95%;
asbestos-containing 90%

-Filtration tests with sparkling wine conducted together with a leading German producer provided us with excellent and comprehensive data on the retention of our asbestos-free sterilizing sheets under changing flow rates.

Flow rates were gradually brought up to 2,000 l/m²/h. Retention increased with flow rate up to about 1,500 l/m²/h and kept this retention in the range from 1,500 to 2,000 l/m²/h. There was neither a change in service life noticeable, nor any migration of particles. ▲p at filtration beginning was 2.5 bar and increased up to 4 bar.

As a result of these tests the producer changed to asbestos-free sterile filtration at a set flow rate of 1,100 to 1,400 l/m²/h. The number of sheet filters was reduced by half. The system has been proving its efficiency and reliability since 1979.

Particularly this last example is meant to demonstrate the great assets of asbestos-free sterile filter sheets to those who might still be skeptical. Not all winemakers may be able or want to get into these extreme production figures. It should be mentioned that not only exact planning and filtration equipment alterations were needed, but also setting up an efficient Quality Control Department and exact production steering mechanisms.

These examples are intended to provide the winery manager with ideas that may stimulate further evaluation of the asbestos-free filtration potential. It goes without saying that the filter sheet industry will continue its efforts to maximize the advantages of asbestos-free sterile sheets. Primary goals are improved mechanical handling and further extension of the sheet life.

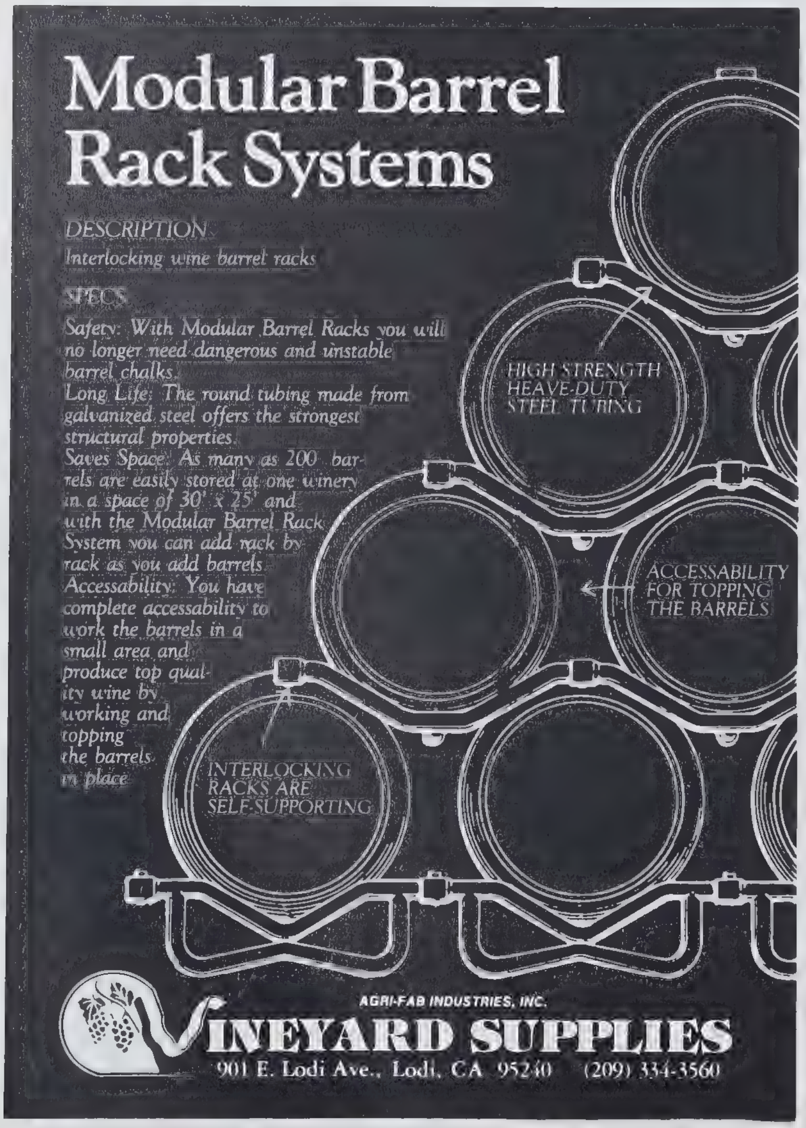
Summary

Sterile wine filtration without the use of asbestos can efficiently be done. The available asbestos-free filter sheets—if raw materials and manufacturing processes are properly selected and usage in the winery follows the recommendations given, meet with the requirements of the wine trade. Their reliability is proven as well as their cost-effectiveness.

**This paper was originally presented to the International Association for Modern Winery Technology & Management, VII International Enology Symposium, Rome, Italy, May 7-9, 1984.*

For further information, contact the United States sales representatives for BECO filter sheets: 2K Packaging Enterprises, Inc., 7914 S.W. Nimbus Ave., Beaverton, OR 97005 (503) 641-8990 or 428 N. Buchanan Circle 2, Pacheco, CA 94553 (415) 676-8990.

Ralf Brandau, sales manager of E. Begerow and Company (West Germany) has recently announced the introduction of Becofloc® to the North American beer and wine industries. Becofloc® is Beco's trade name for its recently developed filter aid. Extensive tests in recent months at a major German brewery have been concluded. Results have shown that when properly mixed with diatomaceous earth, improved clarities and throughput have been achieved when compared to asbestos/DE mixtures or straight DE mixtures. Becofloc® comes in four different grades and is available in both test and production quantities from Begerow's exclusive North American agent: 2K Packaging Enterprises, Inc.


Modular Barrel Rack Systems

DESCRIPTION
Interlocking wine barrel racks

SPECS
Safety: With Modular Barrel Racks you will no longer need dangerous and unstable barrel chalks.
Long Life: The round tubing made from galvanized steel offers the strongest structural properties.
Saves Space: As many as 200 barrels are easily stored at one winery in a space of 30' x 25' and with the Modular Barrel Rack System you can add rack by rack as you add barrels.
Accessability: You have complete accessability to work the barrels in a small area and produce top quality wine by working and topping the barrels in place.

HIGH STRENGTH HEAVE-DUTY STEEL TUBING
ACCESSABILITY FOR TOPPING THE BARRELS
INTERLOCKING RACKS ARE SELF-SUPPORTING

AGRI-FAB INDUSTRIES, INC.
VINEYARD SUPPLIES
901 E. Lodi Ave., Lodi, CA 95240 (209) 334-3560

New Wine Market Forecast

A newly released forecast indicates a total U.S. wine market of 619 million gallons by 1986 versus 527 million gallons in 1983. Other specific projections are:

- Total market growth of 5.5% in 1984 and 6.1% in 1985 versus 2.5% for 1983.
- Wine Cooler shipments rising from 5.5 million gallons in 1983 to 30 million gallons in 1984 and 40 million gallons in 1985 (12% of total California table wines.)
- After 2½ years of flat performance, California table wines (ex. Cooler) to grow at 3% growth in the second half of 1984 and 6% in 1985.
- Reversing a trend since 1979, foreign wines dropping from a 24.9% share of U.S. market in 1983 to 24.0% in 1985.

George M. Schofield, President, cites strong underlying wine demand fundamentals as the basis for the predicted recovery and strong growth. Favorable demographics and life style changes are pointed out as benefiting the new Wine Cooler sales. The resurgence of table and sparkling wines is related to the projected end in the lag response of U.S. wine demand to economic recovery.

GEORGE M. SCHOFIELD CO., an Economic and Financial Planning firm, specializing in the wine industry and agriculture.

COMPUTER SYSTEMS TO HELP YOU PRODUCE QUALITY WINE AT MANAGEABLE COST

NOW WITH TWO INTEGRATED IBM PC SYSTEMS

WINERY INFORMATION MANAGEMENT SYSTEM: Case Goods Inventory, Order Entry and Invoicing, Sales Analysis, Payables, Receivables, and General Ledger.

WINERY PRODUCTION MANAGEMENT SYSTEM: Crush, Blend, Percent Composition and History, Tank Ingredients, Wine Chemistry, Barrel, Cost Analysis, Grower Contracts, and Government Forms.

DATA CONSULTING ASSOCIATES
18000 COLEMAN VALLEY ROAD
OCCIDENTAL, CA 95465
707-874-3067

Water Dynamics brings you

The Designed Drip

ENGINEERED integrated design brings you maximum operating efficiency.

DELIVERED quality, guaranteed parts bring you fail-safe capability.

SERVICED prompt response brings you peace of mind.

water dynamics inc.

the recognized professionals in north coast viticultural irrigation

659 Main St., St. Helena, CA (707) 963-5822

The joy,
The struggle,
The passion. . .

The Vines of Winery Lake

In the mid-1960's, California viticulture began to attract people who had not grown up in winegrowing families. Their enthusiasm spurred the industry to establish a new standard of excellence. One of the most successful of these viticulturists is Rene di Rosa, owner of Winery Lake Vineyards in Napa, CA. His plantings cover 200 selected acres on his more than 460-acre ranch in the Los Carneros region.

di Rosa's grapes rank with the most sought after in California. Over 15 years ago, and for the first time on a wine label, a vineyard location was designated and it was di Rosa's Carneros planting. di Rosa, a newspaper journalist, decided to strike out from San Francisco some 25 years ago. He chose the Carneros region at a time when its potential as a wine growing region was largely unknown. Louis Martini had producing vines in the area, but Beaulieu had only just bought Carneros land for planting.

"Carneros—especially the foothills north of the highway—turned out to be a truly tough region," recollects di Rosa. "The soil is sparse and the weather is chilly-cool with lots of spring-time frosts. Afternoon winds whip loose some canes all summer long. And hell, I thrive here—I just love battling Mother Nature!

"Before I settled here, I went around the state looking for vineyard land. Most of it looked fertile, like you could dig your shovel in the ground and the handle would sprout green before you pulled it back out. Well, that's no fun for a fellow who enjoys swimming upstream against the current.

"What I found on my forsaken place here in Carneros was a century-old abandoned winery, a struggling grove of olive trees, but no sign of grapes, long plowed under. Well, there's an ancient saying that if the soil's too poor for anything else, plant an olive tree or a grape vine. You won't get much, but what you do get is good—the best. The struggling produces character in the fruit, maybe it's the same with a person," says di Rosa.

di Rosa seems to relish the mischief that nature can heap on someone who farms the area. "A fellow from a St. Helena winery came around recently looking for grapes. He was inspecting one of my Pinot Noir plantings and said he guessed the vines must be four or five-years-old by the size of them, and by the scant fruit they set. Well, somehow, I didn't want to

GEORGE M. SCHOFIELD CO.

FINANCIAL AND ECONOMIC PLANNING
SPECIALIZING IN THE WINE INDUSTRY

INVESTMENT EVALUATION
COST ANALYSIS OF OPERATIONS
FINANCIAL PROJECTIONS
TAX PLANNING
REVIEW OF TAX SHELTER PROPOSALS
ACCOUNTING SYSTEM ANALYSIS
BANK LOAN NEGOTIATIONS
LEASE ANALYSIS
CASH MANAGEMENT
INDUSTRY FORECASTS
MARKETING PLANS
COMPUTER APPLICATIONS

GEORGE M. SCHOFIELD, C.P.A., PRESIDENT • P.O. BOX 170 ST. HELENA, CA 94574 707-963-3333

correct him, and tell him he was looking at struggling 14-year-old vines, and then have him say that up-valley a 14-year-old vine would look more proper, like a tree, maybe."

Getting down to the specifics of the district, di Rosa noted what makes Winery Lake unique. "First of all perhaps, it is the maturity of the vines, some of which are almost 25-years-old. Andre Tchelistcheff has stated that with each year of vine age, up to 40, an additional point can be granted to the wine on a scale of 20. In other words, wine quality increases as vines mature.

"One winery I sell to claims that the 30-acre lake in the center of the vineyard is a climatic benefit. Another winery believes that the particular wild yeast strain on Winery Lake grapes imparts a very special quality." di Rosa shrugs his shoulders in wonderment and continues describing what is more conventional about his land and farming practices.

When di Rosa replants, he plants rootstocks in the spring and then field-buds the vinifera 1½ years later. In the next spring when budbreak indicates a successful 'take', the upper part of the rootstock is cut-off. di Rosa has found that bench-grafted stock lacks vigor for his location.

The two best known Winery Lake varietals are Pinot Noir and Chardonnay derived largely from UC Davis clones. Pinot Noir covers 80 acres; Chardonnay - 65; Merlot - 30; Johannisberg Riesling - 24; and Gewurztraminer - 5 acres. All vines are planted 6 X 12 feet. Sloped vineyards are trained on two wire trellises and on some of the plateau vineyards, cross-arms are used.

The majority of Winery Lake vines are pruned to two canes. Vines producing grapes for sparkling wine retain extra canes. di Rosa does not use cordon pruning because more serious damage is possible from a spring frost in Carneros than with canes. Suckering is done in late May to remove shoots growing at ground level. Occasionally, canes are trimmed for ventilation as a safeguard against rot and to expose grapes to sunlight. Merlot does not always ripen regularly and he often thins the clusters to remove second crop bunches which could retard overall maturity at harvest.

Morning glory is the major weed enemy in the Winery Lake Vineyard. Fighting it has been a yearly battle as winds carry in seeds from surrounding areas. Roundup® herbicide has proven effective, but difficult treatment times and reseeding within the same year have made morning glory a continual problem. Eliminating other weeds with pre-emergent sprays and spring contact herbicides also lessens competition for deep-rooted morning glories.

Grape leaf-roll virus is one of di Rosa's major concerns. Its symptoms are painfully progressive. "It was livable in the beginning, but it is becoming more serious. Within the next several years, I may have to replant 40 acres." Bird damage by starlings and linnets are controlled through trapping.

At Winery Lake, Pinot Noir yields tend to peak at 3¾ tons /acre when the vine is about 6-7 years old. They then stabilize and taper off as the vine continues to age. di Rosa figures a decrease of about 5%/year from this point onward. At a slightly older age than Pinot Noir, Chardonnay attains 2 tons/ acre, a consistently lower producer than Pinot Noir which is the opposite of the Burgundian phenomenon. Growers cultivating Chardonnay in Meursault and Pinot Noir in adjacent Volnay vineyards generally report greater yields and higher sugars in Chardonnay than in Pinot Noir.

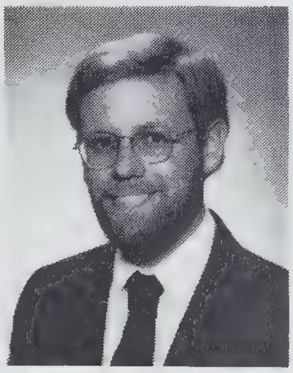
On the other hand, di Rosa's observation of a peak yield at around 6-8 years for Chardonnay does resemble the behavior

an inexpensive Stainless Steel BUTTERFLY VALVE that is SIMPLY BETTER.

EAST COAST
FELDMEIER EQUIPMENT
P.O Box 178, Salina Station
Syracuse, New York 13208
(315) 424-1904

WEST COAST
PRO SALES INC.
222 A Street N.W.
Auburn, Washington 98002
(206) 735-1920
SPRING OPERATED LOCKING ARM
EASILY CONVERTED FOR REMOTE OPERATION
POSITIVE SEALING S.S. DISC
FOOD GRADE SEAL
AVAILABLE IN WELD OR CLAMP ENDS
MANUFACTURED IN T304 S.S. T316 TO ORDER (1½" TO 4" SIZES)
WING NUTS FOR EASY DISASSEMBLY
A3

Dan C. Turrentine


William Turrentine

11 Years of Selling Wine in Bulk
50 Years Experience in the California Wine Industry
North, Central & South Coast, San Joaquin Valley
Varietal & Standard Wine in Bulk
Beverage Brandy, High Proof, Concentrate
Fine Wines for Private Labels

Special Efforts to Fill Your Needs

TURRENTINE
WINE BROKERAGE
125 Fairhills Drive, San Rafael, CA 9 901 Tel: (415) 454-4546

> "What most threatens us today is not Pierce's disease or anything viticultural—it is urbanization."

of these two varieties in Burgundy. For economic reasons, few Burgundian growers maintain their vineyards for 50 or more years as they did in the past.

One practice di Rosa has borrowed from Europe and updated is soil reclamation. On a visit to Germany's steep vineyards where winter rains wash valuable top soil down the hillsides, he saw the good earth being carted back up. Much of his own best soil, he knew over the centuries, eroded down from the hills to a low valley which now forms Winery Lake. During a recent dry year, the lake's bottom became hard enough to drive on. As the Germans haul the best soil back up the hills, di Rosa decided to send in huge earth movers to collect the good lake-bottom soil and spread it over range land otherwise too thin for a vineyard. Today, these 20 re-soiled acres support a producing vineyard.

di Rosa began growing quality wine grapes when consumers were little aware of California's viticultural potential. Over the years he has seen a maturing of the industry. But, he has

International Closures & Supplies

415/483•3750

SAN LEANDRO • CALIFORNIA

di Rosa has not used a mechanical harvester. He says that it does not pick selectively enough for the quality harvest he strives for.

also observed the growth of one problem which today menaces all agriculture.

Just west of my vineyard an out-of-town land speculator wanted to divide 1,200 acres of cattle land into 40-acre ranchettes. Sure as shooting, someone would want to build a second house for an 'employee' and soon we'd find a nextdoor village with people complaining that tractors woke them up in the morning and farm dust was covering their city cars."

di Rosa is aware of the need for grapegrowers to work together for mutual benefit but he knows that such efforts are difficult to organize. "Farmers have been too darn busy to be bothered by showing up at endless hearings. They've always said that they've got more important things to do than battle politicians in league with developers. But feelings seem to be slowly changing. I guess the reality of cities leap-frogging across prime agricultural land, laying waste to thousands of acres has angered them."

di Rosa concluded, "One day, up in the hills, I came face-to-face with a coyote. We stood there for a moment, looking at one another, and somehow I felt akin to that rascal. He was facing me, a threat to his wild habitat, just as I face developers who want to move onto our farm land. Anyway, I just hope we growers can survive, because unlike the coyote, we can't just move our vineyards up into the wilderness every few years."

—D.B.

◆

PICKERING WINERY SUPPLY

For All Your Maintenance & Chemical Needs
Exclusive Distributors

O'SULLIVAN
Paints & Specialty Coatings
- EPOXY COATINGS
- MILDEWCIDES
- LATEX & ENAMELS

COMPUTERS
Equipment & Software
- WINE PRODUCTION PROGRAM
- BULK & CASE INVENTORY
- WINERY ACCOUNTING

WINERY CHEMICALS
100 lbs. TO CONTAINER LOADS
ALL TYPES OF FLOOR COATINGS

415-821-2400

1300 22nd St., San Francisco, CA 94107

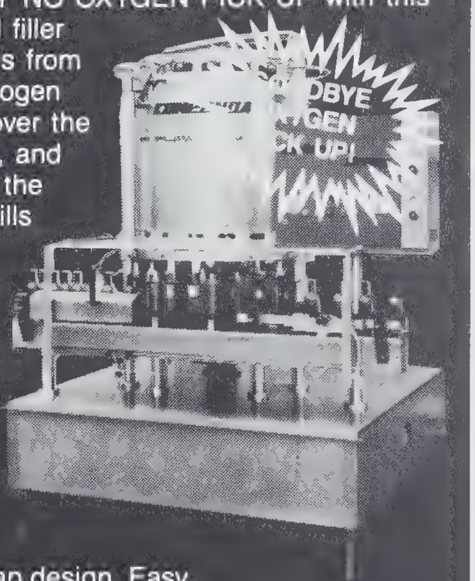
WST COMPENDA
BOTTOM-FILL BOTTLE FILLER

THERE IS VIRTUALLY NO OXYGEN PICK UP with this true gravity, bottom-fill filler from Germany that fills from 20 to 500 bpm! A nitrogen blanket is laid down over the wine in the filler bowl, and bottle air is vented to the atmosphere as wine fills the bottle from the bottom up, via a long SS filler tube.

Our WST Compenda has positive and repeatable level control and is available as a filler only or filler/closure monobloc with natural cork, screw cap, or crown cap design. Easy, quick changeover is effected from 375ml to 4 liter bottles. Full CIP sanitation.

Call today for further information.

PTEI
PROCESS ENGINEERS, INC.
(415) 782-5122
3329 Baumberg Avenue • Hayward, CA 94545



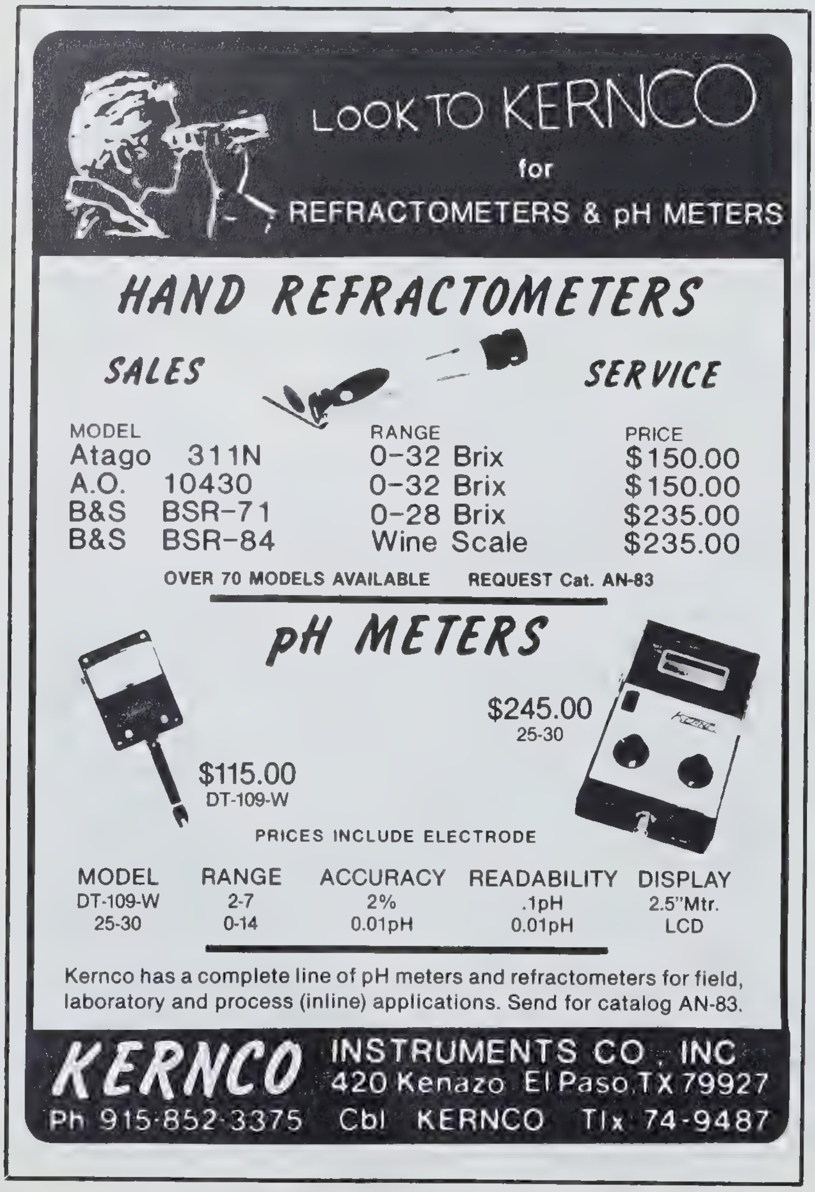
Technical Symposium *from page 7*

CSU Fresno. Peter M.F. Sichel, New York, will give the keynote talk during the Saturday luncheon: 'The International Wine Scene and How California Wines Fit into the Picture'.

Registration opens at 8:15 a.m. both days and sessions begin at 9 a.m. Cost of the seminar, including marketing session and lunch, testimonial dinner, Saturday program, transcript and luncheon is $225. Tickets for the Friday or Saturday program including lunch cost $82.50 each. Friday Achievement Dinner tickets are $50.00. Transcripts of Saturday's proceedings are $10.00 plus postage.

For further information and tickets contact: Diana Lyster, 6 Fair Drive, San Rafael, CA 94901 (415) 457-3007 or J.L. Jacobs, 46 7th Ave., San Francisco, CA 94118 (415) 752-2160. Table top exhibits are available on a first come, first serve basis, at $150.00 for the two days.

Don't prune us out!
Subscribe to
Practical Winery. Now.



LOOK TO KERNCO
for
REFRACTOMETERS & pH METERS

HAND REFRACTOMETERS

SALES **SERVICE**

MODEL	RANGE	PRICE
Atago 311N	0-32 Brix	$150.00
A.O. 10430	0-32 Brix	$150.00
B&S BSR-71	0-28 Brix	$235.00
B&S BSR-84	Wine Scale	$235.00

OVER 70 MODELS AVAILABLE REQUEST Cat. AN-83

pH METERS

$245.00
25-30

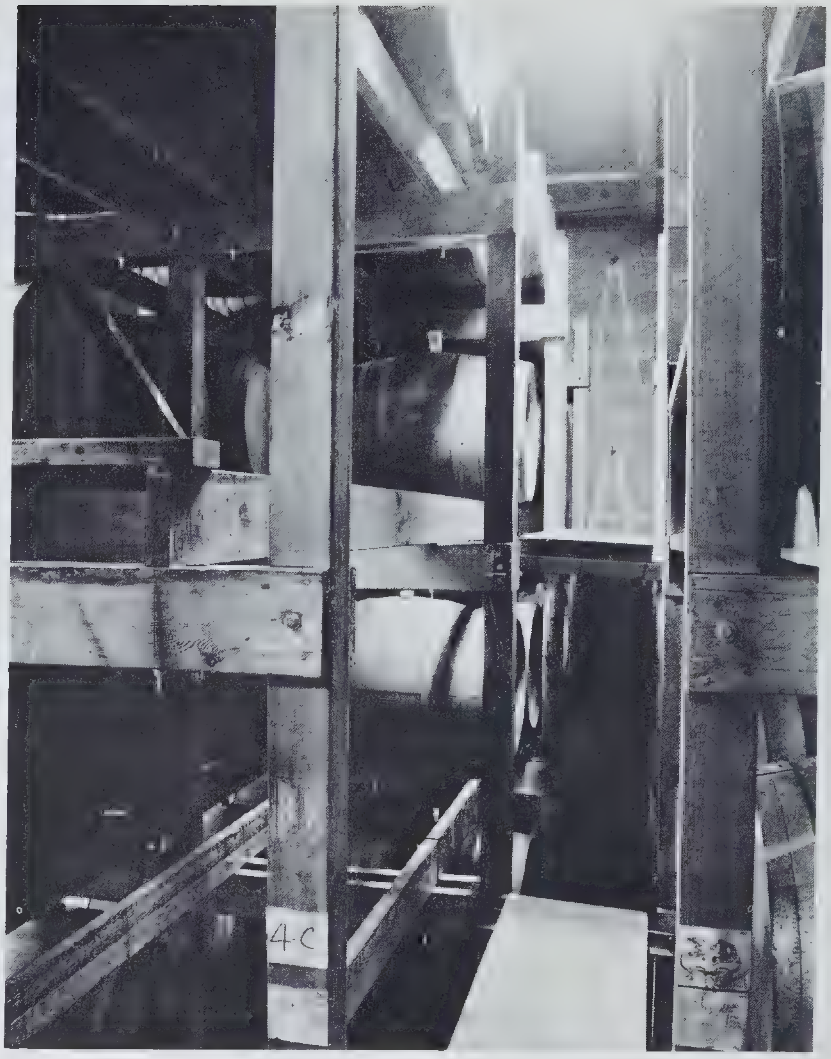
$115.00
DT-109-W

PRICES INCLUDE ELECTRODE

MODEL	RANGE	ACCURACY	READABILITY	DISPLAY
DT-109-W	2-7	2%	.1pH	2.5"Mtr.
25-30	0-14	0.01pH	0.01pH	LCD

Kernco has a complete line of pH meters and refractometers for field, laboratory and process (inline) applications. Send for catalog AN-83.

KERNCO INSTRUMENTS CO., INC.
420 Kenazo El Paso,TX 79927
Ph 915-852-3375 Cbl KERNCO Tlx 74-9487



DAVID BRUCE WINERY has tripled barrel storage capacity with a new storage design by winemaker Keith Hohlfeldt. The unique and space-saving feature is the catwalks located on each tier and quarter-section. Cat walks can be positioned vertically or horizontally, to allow easy access to any barrel on any level at any time. The design also allows easy access to barrels stored with the bung at a 45° angle. Barrels are removed from the racks using a narrow forklift.

Wine Institute Newsletter Offer

For one dollar, members of the beverage industry can become lifetime subscribers to a bi-monthly publication that delivers a wealth of news and features on the many aspects of wine—more specifically, California wine.

The publication is *News from Wine Institute*, and this special offer is Wine Institute's effort to keep the important beverage trade segment informed on happenings in the world of wine.

News From has received praise from wholesalers, retailers, restaurateurs, members of the press, and wine enthusiasts across the country. Items can range from information on food and wine combinations to the latest on the healthful aspects of wine drinking. All of this accomplished in an informal style.

All retailers, wholesalers, restaurateurs, and other members of the beverage industry are invited to take up Wine Institute on this subscription offer. Please send a business card and $1.00 to Wine Institute, Dept. JH, 165 Post Street, San Francisco, CA 94108.

◆

PRACTICAL WINERY LIBRARY

PRACTICAL WINERY *is based on useful articles and comment which are never outdated. We have the pleasure of offering the following back issues at a cost of $5 per copy.*

VOLUME I, NO. 1
Calera Winery (CA) • Carneros Creek Winery (CA) • Sugar Determination Via Rebline Method • Building a DeJuicer • Maintaining Refrigeration Efficiency

VOLUME I, NO. 2
Santa Cruz Mtn Vineyards (CA) • Edmeades Vineyards (CA) • SO_2 via Iodide-Iodate • Filtration, Depth, Crossflow • Polyethylene Tanks • Energy Saving at Robert Pecota Winery (CA)

VOLUME I, NO. 3
SO_2 via Ripper Method & Platinum Electrode • Lawrence Winery (CA) • Tartrate Stability

VOLUME I, NO. 4
McDowell Valley Vineyards (CA) • Enzymatic Wine Analysis • Acid Reduction

VOLUME I, NO. 5
Custom Cooperage • Pumps • Liquid SO_2 • Nouveau Production History

VOLUME I, NO. 6
Rico's Winery (New Mexico) • Fining Wines in 1888

VOLUME II, NO. 1
Ventana Vineyards (CA) • Depth Filtration, Part I • Filter Media Cross Reference Chart • Wine Filtration • Centrifuges

VOLUME II, NO. 2
Moon Valley Circuits' Computers • Depth Filtration, Part II • Elastomers • Tank Presses

VOLUME II, NO. 3
Santino Winery (CA) • Turner Winery (CA) • Hydrogen Sulfide • Plastics • Wastewater Cleanup with Water Hyacinths

VOLUME II, NO. 4
Cordtz Cellars (CA) • Fritz Cellars (CA) • Arroyo Sonoma Winery (CA) • Adler Fels Winery (CA)

VOLUME II, NO. 5
Tank Press Advantages • 1981 California Nouveau Production • Mobile Bottling Lines • Computers in California Wineries • Marketing: How Practical the Small Winery?

VOLUME II, NO. 6
Corks • Wastewater Disposal • Malolactic Fermentation • Silicone Barrel Bungs • Kenwood Winery (CA) Computer • Steel Barrel Racks

VOLUME III, NO. 1
Barrels • Winemaking Consultants • Chardonnay • Ridge Winery (CA) Computer • Lees Filter-Press • Independent Laboratories

VOLUME III, NO. 2
Barrel Shaving • Sauvignon Blanc • Insulated Tank Benefits • Secondary Closure Buyer's Guide • Variable Capacity Tanks

VOLUME III, NO. 3
Roto-Tanks • Refrigeration • Skin Contact Temperature Variation • Pinot Blanc • Fenn Valley Vineyards' (MI) Computer

VOLUME III, NO. 4
O'Enologist/Wayne Marcil • Malolactic Fermentation • Bottle Buyers' Guide • Bottle Manufacturing Quality • Used Bottle Supply • Fining Agents Buyer's Guide • Pinot Noir • Ahlstrom Redesigns Coq Cylinder

*****VOLUME III, NO. 5**
New Membrane Presses • Must Chillers • Sonoma Cutrer (CA) Controls Grape Temperature • French & American Barrel Phenolic Extraction • Chenin Blanc • Bottle Cleaner Option • Buena Vista (CA) Pigeage Fermenter • Theories & Uses of Fining Agents • Modified Screw Press Reduces Wear • Parsons Creek Winery (CA) Crushes and Presses in Vineyard • Making a Winery Successful/F.Woods • Wine People and the Political Process/B.Firestone • Barrels & Wine-Oak Ageing of Sauvignon Blanc

VOLUME III, NO. 6
Fisher Winery (CA) Architectural Award • Fruit Winemaking • Commercial Sterilization of Wine Corks • Merlot • Refrigeration: Ammonia or Freon • Malolactic Fermentation • CO_2 Bottling System • Cakebread (CA) Improves Vineyard Drainage

VOLUME IV, NO. 1
Concannon Winery (CA) • Schramsberg Vineyards (CA) Expansion Equipment Reduces Phenolics • Chardonnay • Acacia Winery (CA) • pH and TA/Jim Vahl • Christian Bros. (CA) Techniques • DE, What is it? • Sterile Filter Myths & Fables • Plate/Frame Filter Equipment & Media • French Red Winemaking • Turner Winery (CA) Improves Bag-in-Box Quality • L.Martini Winery (CA) Cabernet Sauvignon Apellation Comparison

VOLUME IV, NO. 2
Yeast Buyer's Guide • New Filler Valve • Riesling: Grape Varieties and Wine Styles/W.Schug • Gewurztraminer • Pressure Leaf Filter Equipment • Hydralobe Pump • Autolysis at Vichon

VOLUME IV, NO. 3
Grape Prices • Grape Loss to Birds • Pigeage Tank • Sauvignon Blanc • Quail Ridge Winery (CA) • Energy Management • Tank Jacket Designs • Membrane/Cartridge Filters • Direct Expansion Refrigeration Systems • Price Discounting • Wine & Food/Elaine Bell

VOLUME IV, NO. 4
Prohibition • Merchandising • What is IN a Wine?/R.Peterson • Pinot Noir & Food/B.Lang • Use of French Oak at Sebastiani • Bubblical Sense/R.Smith • Pinot Noir • Sterile Bottling/R.S.Scott • Sluggish & Stuck Fermentations • Unique French Vathouse Design

VOLUME IV, NO. 5
Joseph Phelps Winery (CA) Computer • Wineries & Money • Strategy & Development of Clos du Bois (CA) • Individuality & Craftsmanship /B.Ramey • Howe to Score a Wine • Whole Berry Fermentation • Must/Wine pH Quality/R.Beelman • California's Fickle Grape Supply • French Techniques of Cap Management • Sources of Reinfection/ F.Neradt • Coping with Stuck Fermentations

VOLUME IV, NO. 6
Domestic Wine Market Growth • Time to Reconsider Wine-Marketing /M.Cliff • Vinification of Zinfandel at Ridge Winery (CA) • Stand Up for Zinfandel/R.Kozlowski • Wine Ageing in the Bottle/J.Meyer • Trumpetvine Wines Sell Zinfandel • Future for Biotechnology in Vineyard & Cellar? • Growers & Wineries Working Together/R.Phillips • Grower's Perspective on Chardonnay/R.Wicker • Hillside Irrigation /S.Soper • Maceration of Cabernet Sauvignon • Pennsylvania Pragmatism: Naylor Wine Cellars • California Inspection of Harvested Grapes

VOLUME V, NO. 1
Wine Inventory Quandry • Research Funds Essential • Stratford Winery (CA) • Applications of Pectinases • Designs/Options in Pump Selection • Howe to Buy Wine in a Restaurant • Riesling • Ask Your Food • Present Technology in Use of Malolactic Bacteria • Life Among the Malolactics/L.van der Water • SO_2—Limits of Our Understanding • Bentonite • Burgundian Chardonnay Production

VOLUME V, NO. 2
Determining Grape Maturity • Seyval • Monitoring Sugar Per Berry • Improving Accuracy of Crop Estimates • Economics of Producing Chardonnay in the Vineyard

VOLUME V, NO. 3
Elimination of Fermentation Inhibitors • Economics of Producing Chardonnay in the Winery • Tank Presses Replace Screw Presses at Inglenook (CA) • Wine Auctions: A View from the Rostrum/P.Grubb • Predicting Vineyard Yield • Shiraz/Syrah • Malolactic Bactera: Research & Applications • New Detection Method for Grape Defects • Burgundian Chardonnay Production-Part II

****Story Reprints* **only** *are available $1.00 each.*

SERVICES FOR GRAPEGROWERS & WINEMAKERS

Agri-Fab Industries/Vineyard Supplies, PO Box 536, Lodi, CA 95241 (209) 334-3560. B4, V2

Ahlstrom Machinery Inc., PO Box 74, Glen Falls, NY 12801 (518) 798-9541. P3, W3

American Fuji Seal, Inc., 1251 N. Blue Gum St., Dept. W, Anaheim, CA 92806 (714) 630-0450. S2

Anker Labelers Corp., Ark Road, R.D. 2, Mt. Holly, NJ 08060 (609) 261-1166. L4

APM, INC. Benicia Ind. Park, Bldg. W-9, Bay 2, Benicia, CA 94510 (800) 862-7555. C6

Bactomatic, PO Box 3103, Princeton, NJ 08540 (609) 452-8515. W2

Barrel Builders, 1085 Lodi Lane, St. Helena, CA 94574 (707) 963-7914. B2

Blake Printery, 2222 Beebee St., San Luis Obispo, CA 93401 (805) 543-6843. L3

Boswell Company, 305 San Anselmo Ave #313, San Anselmo, CA 94960 (415) 457-3955. B2, B3

Burkhart Industrial Sales, 3654 W. Dry Creek Rd., Healdsburg, CA 95448 (707) 433-3265. P3

Calpac Container Co., 33359 Central Ave., Union City, CA 94587 (415) 471-5091. B8

Cellulo Co., Finer Filter Products Div., 124 M St., Fresno, CA 93721 (209) 485-2692; Cranford, NJ (201) 272-9400. D2, E2, F2, F3, F5, L1, T2, Y1

Centrico, Inc., 3400 Third Ave., Foster City, CA 94404 (415) 349-8900; 100 Fairway Ct., Northvale, NJ 07647 (201) 767-3900. C1

Chateau Bottlers, PO Box 2274, Napa, CA 94558 (707) 253-1254; 26 Woodland Ave., San Rafael, CA 94901 (415) 454-2355. M2

Cherokee Tank Lines, 5463 Cherokee Rd, Stockton, CA 95205 (209) 931-3573. T5

Cherry-Burrell Corp., 2400 6th St.SW, Cedar Rapids, IA 52406 (1-800) 553-8867. F6, P3, T1, V1

Joseph W. Ciatti Co., Inc., 42 Miller Ave., Mill Valley, CA 94941 (415) 388-8301. B12

The Compleat Winemaker, 1219 Main St., St. Helena, CA 94574 (707) 963-9681. B10, C2, C8, D1, F2, F6, H2, L4, L6, P1, P3, S1, S3, S4, T2, T4, V1

Criveller Co., 6863 Lundy's Lane, Niagara Falls, ON., L2G 1V7 (416) 357-2930; PO Box 162, Lewiston, NY 14092. B10, E2, F2, F3, P3, Y1

Custom Cooperage, 1194 Maple Lane, Calistoga, CA 94515 (707) 942-6902. B2, B3, B6

Data Consulting Associates, Inc., 18000 Coleman Valley Rd, Occidental, CA 95465 (707) 874-3067. C5

Duriron Co., Inc., 9542 Hardpan Rd., Angola, NY 14006 (716) 549-2500. F2

Eagle-Picher Industries, Inc., 580 Walnut St., Cincinnati, OH 45202 (513) 721-7010. D2

ENCORE!, 860 So. 19th St., Richmond, CA 94804 (415) 234-5670. B8, B11

ETS (Enological Technical Service), 1804 Main St., St. Helena, CA 94574 (707) 963-4806. L5, M1, Y1

Erickson Transport, PO Box 10068 G.S., Springfield, MO 65804 (800) 641-4595. T5

Ertel Engineering Co., 321 Fair St., Kingston, NY 12401 (212) 226-6023. F2, F3, P3, T1

Estate Bottling, PO Box 1743, Pleasanton, CA 94566 (415) 484-3062. M2

"I read it in
Practical Winery!"
Each time you reference PW, our
foundation becomes stronger.

Feldmeier Equipment, PO Box 178, Salina Station, Syracuse, NY 13208 (315) 424-1904. V1

Fischer & Schug Winery Equipment, 940 Dowdell Lane, PO Box 556, St. Helena, CA 94574 (707) 963-3169. B9, B10, B11, C1, C6, C7, C10, D1, F2, F6, H2, L2, L4, L6, P1, P2, P3, T3, T4, U1, V1

Fogg Filler, 37 Van Dyke St., Holland, MI 49423 (616) 392-1808. B10

Genencor, Inc., 180 Kimball Way, S.San Francisco, CA 94080 (415) 588-3475. E2

Griffin-Rutgers Co., Inc., PO Box 71, East Islip, NY 11730 (516) 277-1500. L1

Groskopf Warehouse, PO Box 128, Vineburg, CA 95487 (800) 221-0229 in California; (707) 996-2113 for other areas. W1

International Closures & Supplies, San Leandro, CA (415) 483-3750. C8, S2

IRAPP, 195 Dry Creek Rd., Healdsburg, CA 95448 (707) 433-9471. R1, T3

JV Northwest Engineering, 18088 SW Lower Boones Ferry Rd., Portland, OR 97223 (503) 684-1490. T1

Kernco Instruments Co., Inc., 420 Kenazo Ave., El Paso, TX 79927 (915) 852-3375. W2

KLR Machines, Inc., 1925-B Francisco Blvd. East, San Rafael, CA 94901 (415) 456-4774; 47 West Steuben St., Bath, NY 14810 (607) 776-4193. H1, P1, S2

Knight's Electric, PO Box 928, Healdsburg, CA 95448 (707) 433-6931. E1

Mel Knox/Stone, 1229 Third Ave., San Francisco, CA 94122 (415) 661-3413 (415) 661-1616. B2, B8, B9, B10, L4

LaFitte Cork & Capsule, Inc., 1180 Hamilton Ct., Menlo Park, CA 94025 (415) 322-1838. C8, S2

Latchford Package Co., 1823 Egbert Ave., San Francisco, CA 94124 (415) 467-1440; PO Box 01707, Los Angeles, CA 90001 (213) 587-7221. C8, S2

Mack-Wayne Closures, PO Box 405, Wayne, NJ 07470 (201) 696-1212; 285 Sutton Pl., Santa Rosa, CA 95401 (707) 584-9711. C9, S2

McBrady Engineering Inc., PO Box 204, East Hazel Crest, IL 60429 (312) 798-6565. B10

Meyerworld Packaging Machinery, 100 Hartwell St., West Boylston, MA 01583 (1-800) 343-6098. L4

Microlife Technics, PO Box 3917, Sarasota, FL 33578 (800) 237-6831. M1

Miles Laboratories, Inc., Biotech Products Div., PO Box 932, Elkhart, IN 46515 (800) 348-7414. E2

Millipore Corp., Bedford, MA 01730 (800) 225-1380. F2

Milltronics, Inc., 709 Stadium Dr. East, Arlington, TX 76011 (817) 277-3543. T3

Moffett Co. Inc., 6985 Via Del Oro A-5, San Jose, CA 95119 (408) 578-4910. B2, B9, C8, B10, F2, F3, H1, L6, P1, S2, S4, Y1

Monitor Manufacturing, PO Drawer AL, Elburn, IL 60119 (312) 365-9403. T3

Nalco Chemical Company, 2901 Butterfield Rd., Oak Brook, IL 60521 (312) 887-7500. F5

Gene K. Nelson, 12786 Old Redwood Hwy., Healdsburg, CA 95448 (707) 433-5138. B2, B3, F6

Netafim Irrigation Inc., 104 S.Central Ave., Valley Stream, NY 11580 (516) 561-6650; 2577 S.Sarah Ave., Fresno, CA 93706 (209) 485-9600, Northern California: (707) 763-1117. I3

Novo Laboratories, Inc., 59 Danbury Rd., Wilton, CT 06897 (203) 762-2401. E2

Pall Ultrafine Filtration Corp., Cortland, NY 13045 (607) 756-7535. F2

John Picchi, A.I.A., 340 Tesconi Circle, Ste. C, Santa Rosa, CA 95401 (707) 544-2060. A2

Pickering Winery Supply, 1300-22nd St., San Francisco, CA 94107 (415) 821-2400. C2, C3, C4, C5, F2, T2

Pneumatic Scale Corp., 65 Newport Ave., Quincy, MA 02171 (617) 328-6100. B10

Power Refrigeration Co., 3466 Arden Rd., Hayward, CA 94545 (415) 887-4105. R1

Process Engineers, Inc., 3329 Baumberg Ave., Hayward, CA 94545 (415) 782-5122, (800) 972-0904. A2, B9, B11, B10, C1, C10, D1, F2, F3, F6, H1, H2, L4, L6, P1, P2, P3, S1, S3, S4, T2, T4, U1, V1, W3

Rain Bird Sales, Inc., 145 N. Grand Ave., Glendora, CA 91740 (818) 963-9311; 1883 Massaro Blvd., Tampa, FA 33519 (813) 621-0624. I3

Ramondin USA, 1041 Edwards Rd, Burlingame, CA 94010 (415) 340-7225. S2

Retech, 133 Madera Ave., San Carlos, CA 94070 (415) 593-9593. R1

Rohm Tech Inc., 10 E.40th St., New York, NY 10016 (212) 686-6166. E2

George M. Schofield Co., PO Box 170, St. Helena, CA 94574 (707) 963-3333. F4, V3

Scholle Corp., 19500 Jamboree Blvd., Irvine, CA 92715 (714) 955-1750. B1

Scott Laboratories, Inc., PO Box 9167, San Rafael, CA 94912 (415) 457-8460; Elmira, NY (607) 739-8818; Pickering, Ontario, Canada (416) 839-9463; Kelwona, British Columbia (604) 769-5393. B9, B10, B11, C8, D2, E2, F2, F3, F5, H1, L5, L6, M1, P3, S2, S4, T2, W2, Y1

Spokane Metal Products, PO Box 3621, Spokane, WA 99220 (1-800) 572-3709 WA, (1-800) 541-3601 outside WA. T1

Stefanich, PO Box 77021, San Francisco, CA 94107 (415) 974-5526. B2

Storm Engineering, 15 Main St., Winters, CA 95694 (916) 795-3201 W4

TEMCO, Inc., PO Box 6039, Bellevue, WA 98007 (206) 747-1550. C7

Templock Corp., PO Box 40230, Santa Barbara, CA 93103 (805) 684-7676. B10

Thermo Systems Inc., 1003 Commercial St., San Carlos, CA 94070 (415)595-0665. R1

Tonnellerie Francaise, 1401 Tubbs Lane, Calistoga, CA 94515 (707) 942-9301. B2

Turrentine Wine Brokerage, 125 Fairhills Dr., San Rafael, CA 94901. B12

2K Packaging Enterprises, Inc., 7914 SW Nimbus Ave., Beaverton, OR 97005 (503) 641-8990; 428 N. Buchanan Circle #2, Pacheco, CA 94553 (415) 676-8990. B10, B11, C8, C9, C10, D2, E2, F2, F3, F5, H1, L1, L2, L4, L6, S2, S4, Y1

Valley Foundry & Machine Works, 2510 S. East Ave., Fresno, CA 93717 (209) 233-6135. C7, C10, D1, F2, F6, H1, H2, I4, L6, P1, P3, S1, S3, T1, T2, T3, T4, V1, W3

VINQUIRY, 301-D East Street, Healdsburg, CA 95448 (707) 433-8869. C7, L5, M1, W2, Y1

Water Dynamics, 659 Main St., St. Helena, CA 94574 (707) 963-5822. I3

WESTEC, 195 Dry Creek Rd., Healdsburg, CA 95448 (707) 433-8829. F6, P3, W3

Brian R. White Co., Inc., 313 Henry Station Rd., Ukiah, CA 95482 (707) 462-9795. I3, S1, V2

Wilden Pump & Engineering Co., 22069 Van Buren St., Colton, CA 92324 (714) 783-0621. P3

Wine And The People, 907 University Ave, Berkeley, CA 94710 (415) 549-1266. B10, C9, D1, F2, F3, H2, L2, P1, P3, S4, W2

Winery Equipment Systems, PO Box 3361, Napa, CA 94558 (707) 257-1103. P3, W3

The Wine Lab, 1200 Oak Ave., St. Helena, CA 94574 (707) 963-7903. L5, M1, W2, Y1

VILTER OWNERS

Order your compressor parts from PRP and you'll save. Plus you'll receive 12/18 month guaranteed top quality PRP manufactured parts.

Call 415-887-4105
Overnight delivery available

POWER REFRIGERATION PARTS CO.

3466 Arden Road, Hayward, CA 94545

INDEX OF VENDOR SERVICES AND SUPPLIES

A1	Adhesives
A2	Architect/Engineer
B1	Bag-in-Box Packaging
B2	Barrel Broker/Cooper
B3	Barrel Bungs
B4	Barrel Pallets (portable)
B5	Barrel Storage Racks (stationary)
B6	Barrel Shaving
B7	Bird Control
B8	Bottles
B9	Bottle Cleaners/Washers
B10	Bottling Equipment
B11	Bottle Washing & Sterilization
B12	Brokers (Wine, Brandy, Alcohol)
C1	Centrifuges
C2	Chemicals
C3	Cleaning Agents
C4	Coatings/Protective Mildewcides/Epoxies
C5	Computer Services
C6	Consultant, Winemaking
C7	Conveying Equipment
C8	Corks (natural)
C9	Corks (plastic)
C10	Crushers-Stemmers
D1	Dejuicers
D2	Diatomaceous Earth
E1	Electrical Installation
E2	Enzymes
F1	Fertilizer
F2	Filter Equipment
F3	Filter Media
F4	Financing/Financial Services
F5	Fining Agents
F6	Fittings, Stainless Steel
G1	Gases (CO_2, Nitrogen, SO_2)
G2	Grape Harvesters (mechanical)
H1	Heat Exchngrs/Cold Stabilization Eqpmt
H2	Hose
I1	Insect Control
I2	Insulation (foam)
I3	Irrigation Equipment
I4	Ion Exchange Equipment
L1	Label Coding Equipment
L2	Label Gluing Equipment
L3	Labels
L4	Labeling Machinery
L5	Laboratories (analysis)
L6	Lees Filter-Press
M1	Malolactic Bacteria
M2	Mobile Bottling Line
N1	Nurseries
P1	Presses
P2	Process Control Systems
P3	Pumps
R1	Refrigeration/Cooling
S1	Sanitation Equipment
S2	Secondary Closures
S3	Sparging Equipment
S4	Sparkling Wine Eqpmt
T1	Tanks (metal)
T2	Tank Cleaning Eqpmt
T3	Tank Monitoring Eqpmt
T4	Tank Venting Eqpmt
T5	Transportation, Bulk
T6	Trellising Supplies
T7	Turbidity Meters
U1	Used Equipment
V1	Valves
V2	Vineyard Equipment
V3	Vnyd Planning & Mgmt
W1	Warehousing
W2	Wine Analysis Eqpmt/Supplies
W3	Winery Eqpmt Dsgn/Mfr
W4	Winery Water Engineering
Y1	Yeast

SUBSCRIPTION CARD

Annual Subscription $24.00/year

Outside the United States add $8.00/year postage or $20.00/year Air Mail

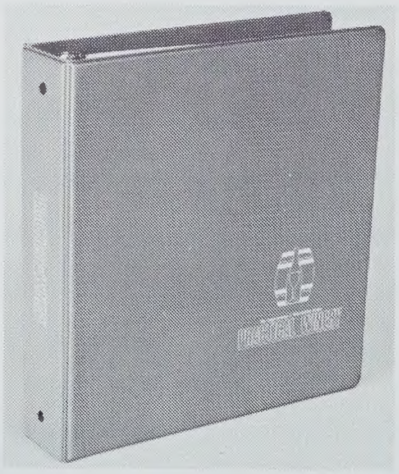
Mail To:
PRACTICAL WINERY
15 Grande Paseo
San Rafael, CA 94903
(415) 479-5819

NAME ____________________
ORGANIZATION ____________________
ADDRESS ____________________
CITY __________ STATE __________ ZIP __________
SIGNATURE ____________________

Check enclosed for $______ for ______ subscriptions.

Bill me for ______ subscriptions, for ______ years.

PRACTICAL WINERY BINDER



$5.00 ea. + $2.00 postage and handling.
Check enclosed for $__________ for ______ binders.
Please ship to:
Name ____________________
Address ____________________
City ______________ State __________ Zip ________

INDEX OF ADVERTISERS

Agri-Fab Ind./Vineyard Supplies	44
Ahlstrom Machinery Inc.	43
American Fuji Seal, Inc.	17
APM, Inc.	56
Barrel Builders	25
Blake Printery	33
Boswell Company	32
Burkhart Industrial Sales	34
Calpac Container Co.	39
Cellulo Company, Finer Filter Div.	28
Cherokee Tank Lines	31
Joseph W. Ciatti Co., Inc.	42
The Compleat Winemaker	35
Criveller Co.	21
Data Consulting Associates, Inc.	45
ENCORE!	26
Erickson Transport Corp.	42
Feldmeier Equipment	47
Fischer & Schug Winery Equipment	23
Fogg Filler	41
Groskopf Warehouse	29
International Closures & Supplies	48
Kernco Instruments Co., Inc.	50
KLR Machines, Inc.	20
Knights Electric	32
Mel Knox	33
Millipore Corporation	4
Moffett Company, Inc.	10
Richard Nagaoka	34
Gene K. Nelson	22
Netafim Irrigation Inc.	9
Pickering Winery Supply	49
Process Engineers, Inc.	49
Power Refrigeration Co.	53
Ramondin USA	35
George M. Schofield Co.	46
Scott Laboratories, Inc.	3
Storm Engineering	30
Turrentine Wine Brokerage	47
Valley Foundry & Machine Works	2
VINQUIRY	12
Water Dynamics Inc.	45
Brian R. White Co.	43
Wine East	21
Wine Industry Technical Symposium	11
Winery Equipment Systems	19

Winery Water & Waste

from page 13

Case Studies

The following describes two small wineries in the planning stage, where winery waste disposition linkage was key to the final formulation of the winery plan complex. Both winery A and B were proposed by vineyardists who, against all good counsel and pleading from wives, friends and bankers, decided to add winemaking to their already ultra-complex existence.

Winery A is on a well-travelled artery of the state highway system, and the beckon of immediate retail traffic was an obvious plus for the site. Vineyards covered 95% of the gross site, with the remaining 5% in roads and irrigation storage ponds. Winery A's size category was small (+/- 600 tons/year crush). For planning purposes, a maximum winery waste discharge of 2,500 gallons per day (gpd) can be physically and economically handled by subsurface disposal (septic tank and leachfield system), if proper soil depth and soil percolation characteristics are found on the site. (2,000 gpd is the maximum industrial discharge permitted by many California counties for treatment and disposal by septic tank and leachfield systems.)

Higher rates of flow generally call for some type of conventional waste treatment system. There are undoubtedly exceptions to the 2,500 gpd design criterion limit, but for purposes of illustration, the value will be used.

Winery A's vineyard dimensions created a gross site longer (along the highway dimension) than it was wide. After necessary code setbacks for structures and state highway right-of-way, the only down-grade (gravity-flow) location for the septic tank system was in a public utility easement and *very* close to a natural water course. The rear property boundary parallel to the highway consisted of a creek, and with a required 100 foot setback from the creek for the leachfield system, options for gravity-flow diminished rather quickly.

The wastewater option, which was finally chosen, and really the only one left with the site constraints, consisted of a septic tank system for primary sedimentation, and treatment with disposal and dilution of the effluent in the large, pre-existing irrigation ponds. While recycling of the winery effluent had its positive environmental and water resource advantages, it presented a problem of future pond water-quality maintenance and potential vine toxicity. As the principal use of large quantities of water was for frost protection, the vineyardist elected to accept some vine-culture risk with the recycling scheme.

The planning lesson to be learned here is that once the locational and physical requirements of the winery were satisfied, there was no net space remaining in which to construct a conventional septic tank and leachfield system and satisfy state and county regulations.

In my opinion, some frustration experienced by Winery A's ownership could have been avoided if the wastewater problem had been introduced into the winery planning equation a little sooner. Site limitations for winery waste would have been revealed earlier, thus forewarning the winery architect of a higher anticipated budget, and the potential future impact upon the vines, both of which came as unwanted surprises in that project.

Winery B, at about the same production capacity as Winery A (2,500 gpd average flow for maximum month), is located in a rather remote area. Nonetheless, the region is frequently sought by the wine buff who is searching for the small winery, which by marketing design, attempts to sell all of their small output through an onsite retail/tasting room scheme. The planning conflict which emerged was the need by the winery ownership to have maximum visibility from the nearby county road to make their chosen marketing approach viable. The so-called 'road site' consisted almost entirely of exposed rock, which for viticultural purposes had wisely been ignored.

A second site, (called the 'lower site') topographically downgrade, but near the centroid of the present and probable future vineyards, was more desirable from a winery constructability standpoint. Wastewater system-linkage for both sites was made somewhat more difficult because of shallow soils prevailing throughout the region. Seasonal soil saturation from normal precipitation and runoff was evident, and the solution to the wastewater problem became one of locating adequate soil depth to satisfy the county septic tank ordinance design guidelines.

As with Winery A, Winery B would install leachlines between vine rows with the knowledge that some adverse effects to vines might result (excess water and potential toxicity from commonly used winery chemical compounds). Additionally, some vine root incursion could occur in the leachlines, eventually reducing the efficiency of that system.

In this planning example, the more readily developable site had to be rejected in favor of the site with the greatest retail sales visibility potential. The solution of the winery wastewater problem, although not ideal, was a balance and compromise for the site and its pedologic and hydrologic constraints.

The planning examples cited have been for the small winery. For larger facilities, the same planning theory and logic applies. Planning for staged construction and growth is probably more important in the medium to large winery, where capital expenditures and production capacity must be balanced against realistic near-future sales. Expansion without pain is, in my view, an achievable objective with careful master planning.

In my experience, the winery planning phase will not be entirely without anguish and frustration for winery principals and design professionals alike. A large dose of suffering will never guarantee an efficient and problem-free winery complex, but sensible and environmentally sensitive planning will go a long way in achieving that goal.

As one who has always been awed by the sheer power of libraries to reveal information, I was distressed to discover that there are no definitive reference texts on winery site planning. General site planning references that might offer check lists, site planning theory, and design logic are listed for those wishing to delve more deeply into the subject.

Amerine, M. and Joslyn, M., *Table Wines-The Technology of Their Production*, University of California Press, 1973.

Dechiara, J. and Koppelman, Lee, *Urban Planning and Design Criteria*, Van Nostrand/Reinhold Company, 1975.

Environmental Resource Press, *Landscape Planning for Energy Conservation*, ASCA Foundation, 1981.

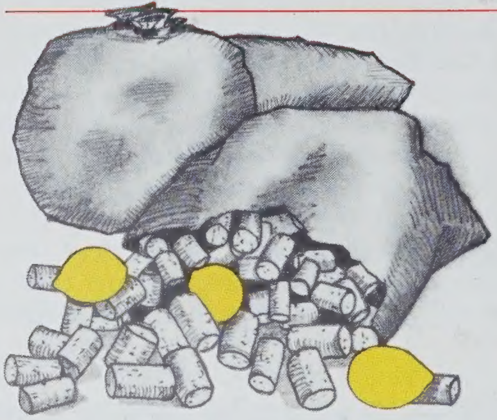
Lynch, Kevin, *Site Planning*, M.I.T. Press, December, 1967.

Untermann and Small, *Site Planning for Cluster Housing*, John Wiley and Sons, April 1978.

?

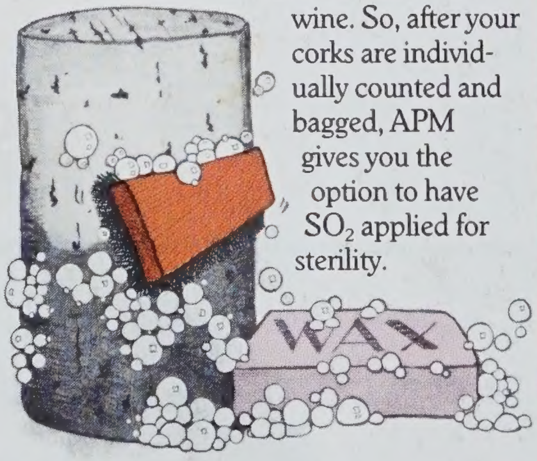
Questions and opinions wanted. Write to Practical Winery.

Five Questions To Ask Before You Buy Cork

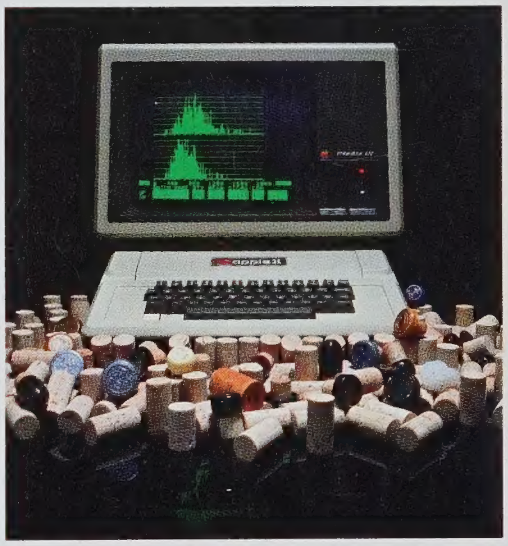


1 Will your shipment quality be consistent throughout? By now, you have all seen the perfect cork sample.. followed by a production that bears little relationship to the sample. The age-old trick of blending qualities to *"average out"* the grade is also well known. Remember, a good cork doesn't make up for a bad one. The computing capabilities and optical scanning devices—that APM alone has brought to the cork industry—let us *"see"* the lemons before they are packaged and shipped to you. APM sends you the precise quality level you requested during sampling. No surprises. No wastage. Only APM can give you that kind of specified quality throughout the lot.

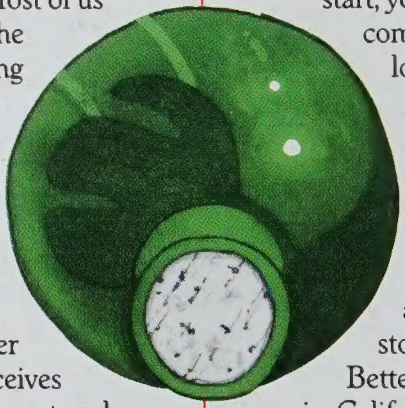
2 How do you process the raw cork you receive? First, all corks received by APM are given a thorough vacuum dedusting. Then samples are moisture-tested—and adjusted if necessary to bring them within an acceptable range. Next, your cork may be printed with your own distinctive logo. Following this, your choice of surface treatment is applied: hot wax Thermo-coat®; cold block paraffin; or silicone. Another thing. Contamination. It is almost always considered a critical defect. It is the characteristic above all others that can adversely affect the wine. So, after your corks are individually counted and bagged, APM gives you the option to have SO_2 applied for sterility.

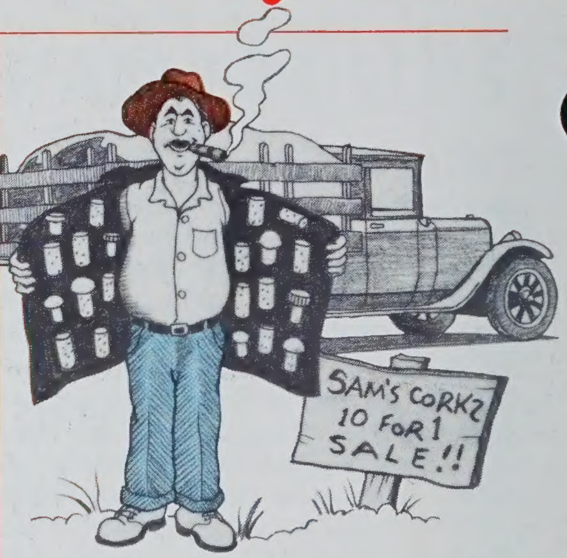


3 How can I order, and receive, the exact price-quality designations that I need? That has been a problem for many. The largest factories in Portugal produce 5 million corks a day and, despite great effort and care, the visual inspection system they use has its shortcomings. Some defective corks get through. The grading system is necessarily subjective. The sophisticated cork buyer thus attempts to minimize the problem by use of statistically-based specifications. APM—alone—carries *"stat-based specs"* a step further. With our exclusive electronic cork sorters we can program our computer to give you the exact price-quality designations you want. Now, for the first time, you can order just the cork you need.



4 How can I determine the real value of cork? Most of us are familiar with the Portuguese grading designations, 1 to 7. It's still a good system, but *take care.* Some suppliers prefer to use the less-accurate name designations. Some compromise the truth. So look for another check also: does the supplier *add* value to the cork he receives from Portugal? At APM, we put each cork through a rigorous process of dedusting, coating, stamping and sterilization. Then we electronically sort the corks before bagging, boxing in corrugated containers, and shipment. To APM, real value means this: accurate grading, maximum yield, and corks you can depend on.





5 Are you fit to do business with me? Cork supply is an easy business to get into; hence the marketplace at times is crowded with suppliers. Realize that many are simply importers—middlemen with little more than a tin shack, telex number and an order book. Some are reputable..others not so. Most don't have the plant setup and technologies to add value to the corks they receive. Many are late or inconsistent shippers. Quite a few will talk about price advantages, until real value is accounted for. What to do? Shop wisely. Let APM—with its 30 years of being the principal supplier of wine stoppers to American vineyards—help you choose the right cork, and reduce your risks.

A smart business decision. From the start, you will find our shipments competitively priced. In the long run, your ability to get consistent wine stopper quality within your required specifications makes APM the smartest buy you can make. Straight corks, bulb tops and plastic champagne stoppers. Call APM today. Better yet, visit us at our Benicia, California plant. And see first-hand the most advanced wine stopper facility in the United States. *APM, Inc., Benicia Industrial Park, Benicia, CA 94510. Toll free (800) 862-7555.*

© Copyright 1984, APM, Inc.

APM, Inc.